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A Comprehensive Survey and Assessment of Policies, Practices and Philosophies

Rachel D. Robertson



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FOREST SERVICE
SOUTHWESTERN REGION
UNITED STATES DEPARTMENT OF AGRICULTURE

REGION 3 -- ADMINISTRATIVE STUDY

WILDERNESS MANAGEMENT IN THE SOUTHWEST

A COMPREHENSIVE SURVEY AND ASSESSMENT
OF POLICIES, PRACTICES, AND PHILOSOPHIES

by

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JANUARY 1986

FOREWORD

The realization of this administrative study is testimony to the belief that mutual benefits are accruable between academic and governmental institutions, where individuals are in place to provide the initiative and spirit of cooperation. The Southwestern Region of the USDA Forest Service was in need of specific information on the status of wilderness expertise and managerial philosophy toward wilderness. Although the need for an administrative study was recognized, the agency and its research stations were unable to conduct the work. At the initiative of Wilderness Staff Assistant Floyd A. Thompson and with my support and that of Assistant Director Richard Spray, the Region contacted Rachel D. Robertson on the possibility of conducting such a study through a volunteer partnership arrangement. Dr. Robertson accepted the challenge and designed a study which would serve as an administrative analysis for the Region as well as important summary research for Rachel which could be published and compared with similar research findings collected by researcher Joseph Roggenbuck in the southeastern states.

Many of the preliminary findings of the study have already been put to use in structuring the agenda of the Region 3 Wilderness School and in the summary report of the 1984 Region-wide Wilderness Activity Review. The final report will be sent to all participating ranger districts, national forests, regional directors and deputies, Washington office staff, and research stations. The intent is to develop a common understanding of where we are in our managerial philosophy and expertise. From this benchmark of understanding, our Region can then begin to systematically improve our wilderness management capabilities.

The Region is indebted to Rachel for her outstanding efforts to complete this comprehensive study of our managers. A large vote of thanks is in order to Arizona State University and the staff at the Department of Leisure Studies for their continuing support to Rachel in the development of this report. In addition, our appreciation is also extended to Keith Alexander, Rachel's graduate assistant, who provided valuable assistance in the collection of the data.

*Paul D. Weingart, Director
Recreation, Region 3
November 1985*

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A special thanks is extended to Keith Alexander, Graduate Research Assistant, who assisted with the interviews and coded the results. His contributions to the study were invaluable. Thanks also to Lynda Anderson, Kathy Tripp, and Mary Cullen for their many hours of cheerful editing and proofreading.

Finally, I am especially grateful to my parents and many friends who so generously gave their continued support throughout the project.

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CHAPTER I

INTRODUCTION

The size of the National Wilderness Preservation System has more than doubled in the past decade, now encompassing more than 80 million acres. This rapid growth in allocation illustrates progress toward the goal of preserving portions of the country as unspoiled wilderness for future generations. However, the allocation process is only a means to an end. That end state is variously defined but generally encompasses the long-term protection of unhampered, natural ecological processes (Stankey 1980). Continued opportunity for primitive recreation and solitude is also intrinsic to the desired end state of wilderness allocation.

The primary means to achieving longevity in wilderness quality is wilderness management. As previously stated by Hendee (1974), this is a "sobering responsibility" for resource managers whose critics will be the generations to come. The familiar dilemma of "use and preservation" confronting National Park managers plagues wilderness managers as well (Stankey 1980). The responsibility of managers is to delicately balance these forces in order to protect the recreational and resource values that wilderness designation sought to preserve. Wilderness managers cannot take a passive role, as designation and wilderness boundaries will not protect wilderness. The managers' role of stewardship has become a central and vital component of wilderness management.

The task of balancing use and preservation involves the definition and implementation of a program of policies and actions to manage wilderness in such a way that it appears unmanaged (Stankey 1980). Wilderness management programs have been developed throughout the wilderness system. Tremendous diversity of physical environments and social impacts has created a need for a variety of management options designed to meet the specific needs of the area. Several efforts have been made to systematically investigate the nature and content of the

various wilderness management programs. Based on a national survey, Washburn and Cole (1983) reported a tabular summary of key data regarding use characteristics, management problems, and management techniques. As Washburn and Cole suggested, their data provided opportunities for more detailed analysis and further study. Two additional surveys of wilderness practices were less comprehensive in terms of component areas, although they provided a valuable reference and foundation for future studies (Godin and Leonard 1979, Bury and Fish 1980, Fish and Bury 1981).

Roggenbuck and Watson (1982) developed a regional analysis of wilderness management in the East (Regions 8 and 9, USDA Forest Service) in an effort to strengthen technology transfer planning. In order to know how and where to target available innovations in management, Roggenbuck and Watson surveyed wilderness managers and reported information on (1) how wilderness areas in the East were being managed, e.g., what innovations had been adopted; (2) characteristics of wilderness managers--their experience and positions in the organization, their wilderness management philosophy, their perceived need for new information and management technologies, their awareness of management innovations, and their sources and communication channels for gaining managerial information; (3) the Forest Service social system and current constraints; and (4) the availability and applicability of wilderness management innovations.

NEED FOR THE STUDY

Prior to this study the research literature did not provide a comprehensive analysis regarding wilderness management in the Southwest. In fact, few wilderness studies have been done in the Southwest as was emphasized at the National Wilderness Research Conference, July 1985. Lucas (1985), in his presentation of the history of wilderness research, stressed the need for baseline, descriptive studies on the nature of wilderness use and management in the Southwest. Management of southwestern wilderness areas is extremely diverse, requiring extensive knowledge of a wide range of professional disciplines, biologic communities, and anthropocentric cultural differences. The passage of the New Mexico Wilderness Act in 1980 and the 1984 wilderness legislation in Arizona presents significant additional wilderness management challenges for the southwestern region in both increased land acreage and diversity of settings. Concurrently, the recent grazing guidelines, mining pressures, new emphasis on prescribed natural fire, and emerging access and recreation use issues all pose a significant quantum leap in management responsibilities for personnel assigned to wilderness management.

A survey of wilderness management in the Southwest may be useful to managers, planners, and the research community in much the same

way as the Washburn and Cole study (1983). However, a study with a regional focus has the added benefit of comprehensiveness and specificity to given situations. It may be useful to managers by providing insight on how their area's unique problems and practices relate to those of other districts. Administrative planners, at the the national, regional, or local level, might profit from an overview of management practices, the distribution and severity of problems, and the various responses that managers have attempted in addressing the problems. An analysis of southwestern wilderness management may help administrators determine appropriate innovations to include in technology transfer strategies within the region. And finally it may be useful in reference to the Roggenbuck and Watson study (1982) for comparing wilderness management in the eastern and western regions of the USDA Forest Service.

PURPOSE AND PROCEDURES

The purpose of this study was to investigate the wilderness management practices, philosophies, perceptions of problems, and areas of informational need of the district rangers in the southwestern region (Region 3) of the USDA Forest Service. A secondary purpose was to investigate areas of information need for the continued development, implementation, and evaluation of technology transfer planning for wilderness management in the Southwest. For purposes of this study, technology transfer refers to the flow of information from the source (supplier) of knowledge or innovation to the user of the new knowledge (Roggenbuck and Watson 1982). The term *technology* is often used synonymously with information or innovation. The supplier of technology may be the administrative or research component of the USDA Forest Service; however, managers and/or on-ground personnel also supply information as they transfer technology horizontally within the agency.

At the time of data collection there were 64 districts in Region 3 which included 38 districts with wilderness and two districts with designated primitive areas. Due to the pending Arizona wilderness legislation and continued study of potential wilderness areas, district rangers without wilderness were also included in the study; their responses reflected how they would manage wilderness if it were part of their district.

The procedure for data collection involved structured interviews. Responses were recorded on a 39-page questionnaire. The interview questions were developed in close cooperation with Floyd Thompson, Wilderness Recreation Specialist, Region 3, USDA Forest Service. Rangers were asked to respond to the following interview topics: wilderness management planning, carrying capacity, monitoring wilderness use, monitoring environmental change, visitor management, site management, wildlife management, fire management, wilderness management

philosophy, and information needs. For each issue, we sought to determine what was being done, the ranger's satisfaction with current programs, and knowledge of alternative solutions. The interviews were concluded by asking each ranger to identify his three most serious wilderness management problems.

Prior to the interviews, regional officials informed the district rangers of the study and encouraged their participation. In preparation for the interview, rangers received an introductory outline of the questions to be asked during the interview (Appendix A). Sixty-three of the rangers were interviewed in person or by telephone during the summer and fall of 1984. One ranger in New Mexico had restrictions on long term telephone communication and therefore responded to the interview form by mail. Interviews took approximately one hour to complete, and in all cases cooperation by the rangers was excellent.

CHAPTER II

RESEARCH FINDINGS

This chapter reports the descriptive findings of this study. Frequency distributions are reported for each subtopic. When the sum of the reported responses do not equal the total group size, it is due to nonresponses.

Rangers were asked to respond with yes or no concerning their satisfaction with management techniques. To investigate variance in levels of satisfaction, they were also asked to respond on a five-point likert scale: 1 = not satisfied, 5 = very satisfied. The mean scores for the satisfaction scale and the percentage of yes or no satisfaction responses are reported in this chapter.

At the time of data collection for this study (summer and fall, 1984), 40 of the 64 district rangers in Region 3 were responsible for managing wilderness. For purposes of this study, these rangers are referred to as *wilderness district rangers*. Two of these rangers--Alpine and Clifton districts--were responsible for managing the Blue Range Primitive Area which is managed similar to designated wilderness. There were 24 district rangers who were not managing wilderness at the time of data collection; these rangers are referred to as *nonwilderness district rangers*. Seven of the twenty-four nonwilderness district rangers acquired wilderness responsibility with passage of the 1984 Arizona Wilderness legislation and are referred to as the *new (1984) wilderness district rangers*. Given the preceding figures, 73 percent of the district rangers in Region 3 were responsible for wilderness management in 1985.

MANAGER'S WORK EXPERIENCE

The average years of wilderness management experience for all district rangers in Region 3 was 7.3 years (Table 1). The average years of wilderness management experience for wilderness district

rangers was 9.7 years. For nonwilderness district rangers, the average was 3.6 years. The average for the seven rangers who acquired wilderness responsibility with the Arizona legislation (1984) was 3.9 years. Two of these rangers had no previous wilderness responsibility. The range of experience for managing wilderness was from zero to 22 years.

The 64 district rangers averaged 3.7 years in their current positions. Wilderness district rangers averaged about the same as all rangers with 4.1 years in their present position. The range of years in current positions for the wilderness district rangers was from less than one year to 13 years. These findings suggest that the turnover rate of district rangers with wilderness management responsibility is relatively rapid.

Rangers were asked to identify their two previous positions with the USDA Forest Service in an effort to better understand the basis for current wilderness management strategies and to identify positions in the organization for targeting technology transfer efforts (Table 1). Eighteen of the forty district rangers with wilderness responsibility also had been district rangers in their most recent position; seven had been district rangers in their second most recent job. Four of the wilderness district rangers identified recreation and lands staff as their most recent position and eleven identified the same as their second most recent position. Ten rangers with wilderness responsibility identified timber staff as one of their previous two positions and nineteen had been range staff in one of their previous two positions.

TABLE 1
Wilderness and Other USDA Forest Service Work Experience
Region 3 District Rangers -

NATIONAL FOREST Ranger District	Current Wilderness Responsibility (Yes or No)	Years of Wilderness Responsibility	Years in Current Position	TWO PREVIOUS POSITIONS		
				Position (Most recent) (Second most recent)	Location	Years
APACHE-SITGREAVES						
Alpine	Yes	12.0	6.0	District Ranger	Sandia R.D.	3.5
Clifton	Yes	12.0	12.0	District Ranger	Glenwood R.D.	1.5
Chevelon	No	Ø	6.0	District Ranger	El Rito R.D.	4.0
Heber	No	2.0	5.0	Timber Management Staff	Gallup R.D.	4.0
Springerville	Yes	15.0	5.5	Recreation Lands Staff	Grand Mesa N.F.	4.0
Lakeside	No	7.0	3.0	Recreation Lands Staff	Black Hills N.F.	0.5
CARSON						
Canjilon	Yes	1.5	.5	Timber Sales Staff	Payson R.D.	2.0
El Rito	No	Ø	6 wks	Assistant Timber Staff	Long Valley R.D.	3.0
Jicarilla	No	Ø	.5	Timber Staff	Williams R.D.	5.0
Penasco	Yes	8.0	4.0	Timber Timber Staff	Glenwood R.D.	5.0
Taos	No	1.0	4 mos	Range, Wildlife, Watershed Staff	Region 3 Office	4.0
Tres Piedras	Yes	7.0	1.0	Range, Wildlife, Watershed Staff	Smoky Bear R.D.	3.0
					Carson S.O.	5.0
					Shoshone S.O.	2.0
					Mimbres R.D.	3.0
					Beaverhead R.D.	3.0

Table 1, continued

NATIONAL FOREST Ranger District	Current Wilderness Responsibility (Yes or No.)	Years of Wilderness Responsibility	TWO PREVIOUS POSITIONS			
			Position (Most recent) (Second most recent)	Location	Years	
Questa	Yes	4.0	3.5	Range Substaff Range Staff	Carson S.O. Canjilon R.D.	2.0 5.0
CIBOLA						
Mt. Taylor	No	8.0	1.5	Recreation Lands Staff Recreation Resource Assistant	Santa Fe N.F. Bitterroot N.F.	2.5 3.5
Magdalena	Yes	8.0	7.0	District Ranger Range Conservationist	E1 Rito R.D. Taos S.O.	5.0 1.5
Mountainair	Yes	6.0	7.0	District Ranger Assistant District Ranger	Black Kettle R.D. Prescott N.F.	3.0 4.0
Sandia	Yes	1.0	2½ mos	Planning Officer Staff Environmental Coordinator	Cibola S.O. Region 3 Office	1.75 1.0
Black Kettle	No	Ø	8.5	Range Conservationist Range Conservationist	Coronado N.F. Apache-Sitgreaves N.F.	1.0 1.0
Kiowa N.C.	No	Ø	9.0	Range Conservationist Range Conservationist	Camanche N.C. San Juan N.F.	5.0 1.0
Rita Blanca	No	Ø	7.0	Range Conservationist Range Conservationist	Cimarron N.C. Blackhills N.F.	3.0 4.0
COCONINO						
Beaver Creek	Yes (1984)	8.5	4.5	District Ranger Fire and Rec Staff Officer	Truth or Consequences Chevelon R.D.	4.0 1.5
Elden	Yes (1984)	6.5	7 mos	Assistant Recreation Lands Staff (Forest Plan Responsibilities) Recreation Lands Staff	Apache-Sitgreaves N.F. Lincoln N.F.	6.5 5.5
Flagstaff	Yes	8.0	3.5	Recreation Lands Staff Recreation Lands Staff	Lakeside R.D. N. Kaibab R.D.	5.0 2.0
Long Valley	Yes (1984)	Ø	4.0	District Ranger Timber Staff	Tusyan R.D. Springerville R.D.	6.0 6.0
Mormon Lake	No	14 (off/on)	1.0	Resource Assistant River Basin Planner	Neches R.D. (TX) Atlanta, GA	3.5 9 mos

Table 1, continued

NATIONAL FOREST Ranger District	Current Wilderness Responsibility (Yes or No)	Years of Wilderness Responsibility	Years in Current Position	T W O P R E V I O U S P O S I T I O N S	
				Position (Most recent) (Second most recent)	Location Years
Sedona	Yes	8.5	5.5	District Ranger Range Staff	Beaver Creek R.D. Reserve R.D. 7.5 3.0
Blue Ridge	No	1.0	1.0	Silviculturalist Timber Staff	Apache-Sitgreaves S.O. Pinedale R.D. 4.0 3.0
CORONADO					
Douglas	Yes	13.5	7.0	District Ranger District Ranger	Magdalena R.D. Questa R.D. 11.0 4.5
Nogales	Yes (1984)	Ø	3 mos	Range Conservationist Range Conservationist	Sierra Vista R.D. Mayhill R.D. 6.0 5.0
Safford	Yes	22.0	13.0	District Ranger District Ranger	Penasco R.D. Willcox R.D. 4.0 4.0
Sierra Vista	Yes (1984)	Ø (10.0 in primitive areas)	3 wks (acting D.R.)	Recreation Lands, Minerals Staff Fire, Recreation Lands Staff	Coronado R.D. Alpine R.D. 4.5 5.0
Santa Catalina	Yes	12.0	5.0	Planning & Information Staff Officer Resource Assistant	Coronado S.O. Big Valley R.D. 5.0 3.5
GILA					
Black Range	Yes	12.0	5.0	District Ranger Range Staff	Beaverhead R.D. Tonto N.F. 1.0 4.0
Luna	Yes	19.0	4.0	District Ranger Range Staff Assistant	Walnut Creek R.D. Coronado S.O. 6.0 6 mos
Glenwood	Yes	7.5	1.0	Range and Wildlife Staff Range and Wildlife Staff	Safford R.D. Medicine Wheel R.D. 4.5 2.5
Mimbres	Yes	15.0	9.0	Timber Staff Timber Staff	Alpine R.D. Cuba R.D. 2.5 2.5
Reserve	Yes	10.0	3.0	District Ranger Wildlife Biologist	Jicarilla R.D. Santa Fe S.O. 4.0 4.0

Table 1, continued

NATIONAL FOREST Ranger District	Current Wilderness Responsibility (Yes or No)	Years of Wilderness Responsibility	TWO PREVIOUS POSITIONS		
			Position (Most recent) (Second most recent)	Location	Years
Silver City	Yes	18.0	1.5	District Ranger District Ranger	Tonto Basin R.D. Questa R.D.
Wilderness	Yes	4.0	2.0	Timber and Recreation Staff Minerals Substaff	Cajon R.D. Mt. Taylor R.D.
Quemado	No	7.5	9.5	District Ranger Timber, Range & Wildlife Staff	Las Vegas R.D. Ruidoso R.D.
KAIBAB					
Williams	Yes	8.0	8.0	District Ranger Recreation Lands Staff	Hiawatha N.F. Shawnee S.O.
Chalender	Yes	18.0	9.0	District Ranger Timber, Recreation Lands Staff	Mimbres R.D. Mesa R.D.
North Kaibab	Yes (1984)	3.5	9 mos	Planning Staff Silvicultural Assistant District Ranger	Beaverhead N.F. Kootenia N.F.
Tusayan	No	13.0	4.0	District Ranger Range, Wildlife, Recreation Lands Staff	Crown King R.D. Snowflake R.D.
LINCOLN					
Smokey Bear	Yes	10.0	3 mos	Recreation Lands Staff Recreation Lands Staff	Payson R.D. Sedona R.D.
Cloudcroft	No	Ø	2 mos	Timber Management Staff Assistant Timber Staff	Region 3 Office C arson S.O.
Guadalupe	No	Ø	5.0	Recreation Lands Staff Range Staff	Tonto S.O. Caddo-LBJ R.D. (TX)
Mayhill	No	4.0	3 mos	District Ranger District Ranger	Cloudcroft R.D. Nogales R.D.
PREScott					
Chino Valley	Yes	15.0	4.5	District Ranger District Ranger	Pagosa R.D. Camp Verde R.D.

Table 1, continued

Research Findings

NATIONAL FOREST Ranger District	Current Wilderness Responsibility (Yes or No)	Years of Wilderness Responsibility	Years in Current Position	TWO PREVIOUS POSITIONS		
				Position (Most recent) (Second most recent)	Location	Years
Bradshaw	Yes (1984)	9.0	5.0	District Ranger District Ranger	Chino Valley R.D. Beaverhead R.D.	4.0 5.0
Verde	Yes	10.0	6 mos	Range, Water, Wildlife Staff Range, Water, Wildlife Staff	Alpine R.D. Beaverhead R.D.	7.0 3.0
SANTA FE						
Coyote	Yes	21.0	6.0	Sub-Range Staff Range, Watershed, Wildlife Staff	Santa Fe S.O. Reserve R.D.	2.0 5.0
Cuba	Yes	5.0	1.5	Range Staff Range, Recreation Lands Staff	Canjilon R.D. Helena R.D. (Helena N.F.)	3.0 1.0
Jemez	Yes	3.5	2.0	District Ranger Soil & Water Staff Officer	Tesuque R.D. Santa Fe S.O.	1.5 3.0
Las Vegas	Yes	14.5	4.0	Range, Wildlife, Watershed Substaff	Santa Fe S.O.	2.0
Pecos	Yes	11.0	2 mos	Range, Wildlife, Watershed Staff	Espanola R.D.	4.0
Tesuque	Yes	8.0	1.5	Resource Assistant	Craig R.D. (Tongass N.F.)	3.5
Espanola	Yes	9.0	4 mos	Recreation Lands, Timber Staff	Mimbres R.D.	4.0
TONTO						
Cave Creek	Yes	6.5	10 mos	District Ranger	Pine R.D. (San Juan N.F.)	4.0
Globe	Yes	2.5	2.5	Forest Wildlife Biologist Timber Substaff	Rio Grande S.O. Tonto S.O. Tres Piedres	2.0 4.0 4.0

Table 1, continued

NATIONAL FOREST Ranger District	Current Wilderness Responsibility (Yes or No)	Years of Wilderness Responsibility	Years in Current Position	TWO PREVIOUS POSITIONS		
				Position (Most recent) (Second most recent)	Location	Years
Mesa	Yes	4.0	4.0	Recreation Lands Staff Recreation Lands Staff	Nogales R.D. Long Valley	4.0 1.0
Payson	Yes	12.0	2.0	District Ranger Recreation Lands Staff	Gila N.F. Prescott N.F.	2.5 2.0
Pleasant Valley	Yes	4.0	4.0	Timber Staff Timber, Fire Staff	Alpine R.D. Pecos R.D.	5.0 3.0
Tonto Basin	Yes	4.5	1.0	Land Management Planner Supervisor, Range Conservationist	Tonto S.O. Boise (B.L.M.)	3.0 3.0

MANAGER'S WILDERNESS PHILOSOPHY

Primary Values and Benefits of Wilderness. Two alternative philosophical notions about wilderness and the basis for its values are the anthropocentric philosophy and the biocentric philosophy (Hendee et al. 1978). Within the anthropocentric position, wilderness is viewed from primarily a sociological or human-oriented perspective; opportunities for direct human use are paramount. Within the realm of management, the *use and enjoyment* phrase of the Wilderness Act is given emphasis.

In contrast to the anthropocentric perspective, the biocentric philosophy emphasizes the maintenance of natural systems at the expense of recreational and other human uses if necessary (Hendee and Stankey 1973). The long-term goal of the biocentric philosophy is to permit the natural ecological processes to operate as freely as possible because wilderness values for society ultimately depend on the retention of naturalness (Hendee et al. 1978). Management emphasis is given to preservation of naturalness in order to maintain the social psychological values of wilderness.

The purpose of introducing these two philosophical approaches is not to create a false distinction between *wilderness for human's sake* and *wilderness for wilderness' sake*. Wilderness areas have been designated as such for people to use and enjoy. These two philosophies represent extremes on a continuum of management orientations. The important distinction between these two philosophies, as highlighted by Hendee, Stankey, and Lucas (1978), is the extent to which the human benefits of wilderness are seen as being dependent on the natural integrity of the wilderness setting (Hendee et al. 1978). It is unlikely that either should be followed slavishly, but they do help highlight potential orientations toward wilderness management. Depending upon which of the two philosophies a manager tends to emphasize, he will likely seek out and adopt management strategies and philosophies consistent with that philosophy.

In order to better understand the philosophical orientation of the district rangers in Region 3, the respondents were asked to list and rank what they believed to be the three primary benefits or values of wilderness (Table 2). It is difficult to accurately classify a given value in relation to the preceding philosophical definitions; however, of the 40 wilderness district rangers, it appeared that 20 listed a biocentric benefit and 20 listed an anthropocentric benefit as their first choice value of wilderness.

Preservation of a natural area was the most common value chosen by 24 of the 40 wilderness district rangers. Seventeen of these 24 rangers identified it as first choice. Wilderness as an ecological benchmark was the second most common value selected by 19 wilderness district rangers. The following figures depict the number of wilderness

district rangers who listed biocentric values as their first, second, and/or third choice.

	<u>First Choice</u>	<u>Second Choice</u>	<u>Third Choice</u>	<u>Total</u>
Preservation of natural area	17	3	4	24
Ecological benchmark/research	3	8	8	19

In analyzing second and third choice values, all wilderness district rangers who included resource-oriented values also included people-oriented values, with the exception of one ranger who listed only one value.

Solitude was identified as an important value by 16 wilderness district rangers. Opportunities to develop self reliance was identified by 11 rangers. An escape from the urban environment, recreational opportunities, aesthetics/beauty, spiritual values, and "just knowing wilderness exists" were also identified as important wilderness values. Twenty rangers with wilderness responsibilities identified people-oriented or anthropocentric values as their first choice, as shown below:

	<u>First Choice</u>	<u>Second Choice</u>	<u>Third Choice</u>	<u>Total</u>
Solitude	5	8	3	16
Self-reliance opportunities	2	5	4	11
Escape urban environment	1	4	3	8
Recreational opportunities	2	3	3	8
Aesthetics/beauty	2	3	1	6
Spiritual values	3	Ø	3	6
Just knowing it exists	2	1	2	5
Other uncategorized responses	3	5	1	9

When second and third choice values were analyzed, eight of the 40 wilderness district rangers included only people-oriented values in their list of three choices.

The 24 nonwilderness district rangers--rangers who did not have wilderness responsibility at the time of data collection--were also asked to respond to this question. Again, the most common response was preservation of a natural area; 15 of the 24 nonwilderness district rangers identified it as one of three values, and nine listed it as first choice. Solitude was the second most common response among nonwilderness district rangers, identified by 13 as an important value and by five as first choice. Wilderness as an ecological benchmark was the

third most common response; seven rangers identified it as an important value but only one listed it as first in importance.

Findings regarding wilderness values and benefits indicate that the rangers in Region 3 reflect both philosophical orientations. It is interesting to note that biocentric and anthropocentric values were equally represented as first choice benefits by the wilderness district rangers; however, the distribution for nonwilderness district rangers leaned farther toward the people-oriented benefits: nine identified biocentric values as most important and 15 identified anthropocentric values as most important. When lower priority values were analyzed for all 64 district rangers, only nine listed more than one biocentric value. All rangers who listed a biocentric value also listed people-oriented values, with the exception of two rangers who listed only one wilderness value. On the other hand, 15 rangers listed only people-oriented values. Of the 64 rangers, 47 included both resource-oriented and people-oriented values.

Managerial philosophy of wilderness areas is a continuum of use-management actions ranging from those that are subtle, indirect, and light-handed to those that are direct, authoritarian and heavy-handed (Hendee et al. 1978). Rangers were asked about their personal philosophy regarding the proper role of the manager in achieving wilderness benefits (Table 2). Rangers were also asked about the primary management obligation of the ranger based on the 1964 Wilderness Act. It is impossible to locate each ranger on the management spectrum, yet by examining the results in Table 2 it seems most district rangers in Region 3 perceived a need for active managerial intervention to protect the resources and/or provide for user experiences. Many reflected an indirect approach; others saw a need for heavy-handed management. Both management actions are appropriate; the decision as to which is most appropriate depends on a manager's judgments about the degree of regulation necessary to achieve wilderness management objectives (Hendee et al. 1978).

TABLE 2

**District Rangers' Perceptions of Wilderness Values or Benefits and Their Philosophy
of the Manager's Role in Achieving Those Benefits**

NATIONAL FOREST Ranger District	Values or Benefits (Rank Ordered)	Managerial Philosophy	Primary Management Obligations of Ranger Based on 1964 Wilderness Act
APACHE-SITGREAVES			
Alpine	<ol style="list-style-type: none"> 1. Preserving a relatively undisturbed ecotype. 2. Solitude. 3. Compare natural and managed areas. 4. To know that wilderness areas exist. 	<p>Be informed of current and planned uses of the wilderness; have basic agreement with personnel on wilderness philosophy to manage the wilderness consistently.</p>	<p>Keep the wilderness in the highest wilderness quality possible within the limits of the law.</p>
Clifton	<ol style="list-style-type: none"> 1. Nondisturbed areas, protected areas. 2. Solitude. 3. Scenic and aesthetics. 4. Wilderness as an attraction for local economies. 	<p>Keep area as accessible as possible with the least restrictions necessary to maintain the wilderness quality.</p>	<p>Protect the wilderness as the Act says.</p>
Chevelon	<ol style="list-style-type: none"> 1. Place to get away from normal lifestyle and people. 2. Place to see area as it was before modern man. 3. Place to see natural area as it was before modern man. 	<p>Make it happen with the use of proper tools.</p>	<p>Preserve areas not strongly influenced by man.</p>
Heber	<ol style="list-style-type: none"> 1. Solitude. 2. Experiencing unspoiled country. 3. High-risk recreation. 4. Exercise. 	<p>Support the intent of the Wilderness Act; monitor and report deviations; recommend action; implement management changes as needed.</p>	<p>Same as managerial philosophy.</p>
Springerville	<ol style="list-style-type: none"> 1. Scenic value. 2. Solitude. 3. Areas in their natural state. 	<p>Assess the situation and direct the program to manage the wilderness properly.</p>	<p>Manage wilderness in as near a natural state as possible; keep the wilderness values as well as possible for the greatest number of people.</p>
Lakeside	<ol style="list-style-type: none"> 1. Naturalness of the area, uninterrupted by man. 2. Beauty. 3. Solitude. 	<p>Use policy regulation to insure that values and benefits are met.</p>	<p>To protect wilderness from impacts of all environmental uses going on outside the wilderness area.</p>

Table 2, continued

NATIONAL FOREST Ranger District	Values or Benefits (Rank Ordered)	Managerial Philosophy	
		Primary Management Obligations of Ranger Based on 1964 Wilderness Act	
CARSON			
Canjilon	1. Nondisturbed areas of land. 2. Scenic. 3. Wildlife.	Maintain the spirit of the wilderness; set up guidelines to maintain and monitor the wilderness conditions.	Maintain the wilderness integrity.
E1 Rito	1. Scenic. 2. Remote. 3. Primarily recreation. 4. Personal value of a wilderness experience (getting to nature and away from it all).	Provide the opportunity for the wilderness experience; manage wilderness so wilderness users can use it the way they expect it to be.	Protect the integrity and intent of the wilderness areas as set aside by Congress.
Jicarilla	1. Preserving the area naturally (aesthetics). 2. Gives the public wilderness experience.	Maintain use within capacity; i.e., keep resource damage to minimum but still allow wilderness experience.	Preserve area in natural state without allowing resource damage.
Penasco	1. Preserve areas with pristine and natural values for future generations. 2. Solitude. 3. Natural wildlife habitat.	Maintain and emphasize wilderness values in conjunction with wilderness philosophies.	Same as managerial philosophy.
Taos	1. Protect natural areas with allowed use. 2. Provides a wilderness recreation opportunity. 3. Vegetation studies, see how natural area was.	Monitor and alter management to achieve the goals of wilderness.	Manage wilderness area for entire ecosystem in as near a natural condition as possible.
Tres Piedras	1. Aesthetics - scenic. 2. Solitude. 3. Recreation.	Identify public's needs and desires; carry out that policy and monitor it.	Carry out the wilderness management plans of the Act and the individual wilderness plans.
Questa	1. Practically undisturbed area. 2. Unique characteristics/scenic. 3. Solitude. 4. Preserve for future generations.	Carry out the Wilderness Act policy; maintain the wilderness as best possible under those mandates.	Manage wilderness to preserve for future generations.

NATIONAL FOREST Ranger District	Values or Benefits (Rank Ordered)	Managerial Philosophy	
		Primary Management Obligations of Ranger Based on 1964 Wilderness Act	
CIBOLA	Mt. Taylor	<ul style="list-style-type: none"> 1. Solitude. 2. Wilderness available as a natural area. 3. Base line to compare with areas manipulated by man. 	<p>Allow wilderness to evolve by itself; manager eliminates extremes of human impact to enhance wilderness.</p> <p>The less the manager does, the better; ensure the wilderness remains a wilderness.</p>
Magdalena		<ul style="list-style-type: none"> 1. Natural area for future generations to enjoy. 2. Opportunity for research. 	<p>Be unobtrusive; impose as little as possible to wilderness users.</p> <p>Educate public on wilderness ethics; preserve wilderness character.</p>
Mountainair		<ul style="list-style-type: none"> 1. Solitude, isolation. 2. Experience primitive aspects. 	<p>Be unobtrusive; impose as little as possible to wilderness users.</p>
Sandia		<ul style="list-style-type: none"> 1. Place to be close to nature and natural areas. 2. Spiritual importance--see what God has done for us. 3. Scenic backdrop for natural area. 4. Research potential or gene pool. 	<p>Educate public on wilderness ethics; preserve wilderness character.</p>
Black Kettle		<ul style="list-style-type: none"> 1. Area to get away to. 2. Area to rough it in, no conveniences. 	<p>Learn how to manage wilderness for appropriate development.</p>
Kiowa N.C.		<ul style="list-style-type: none"> 1. Preserve natural state for future generations. 2. Provides recreation for people. 3. Solitude. 	<p>Maintain integrity of the wilderness.</p>
Rita Blanca		<ul style="list-style-type: none"> 1. Meet public demand. 	<p>Meet demands of people and resources (for adequate protection).</p>
COCONINO	Beaver Creek	<ul style="list-style-type: none"> 1. Place to get away to. 2. Solitude. 3. Visual, place of limited intrusion by man. 	<p>Protect the limits of the law and see that area continues to have wilderness character.</p> <p>Make sure law is followed; establish carrying capacity and monitor use accordingly.</p>

Table 2, continued

NATIONAL FOREST Ranger District	Values or Benefits (Rank Ordered)	Managerial Philosophy	Primary Management Obligations of Ranger Based on 1964 Wilderness Act
Elden	1. Get away from normal activities. 2. Solitude. 3. Feeling of space.	Maintain those values by managing the people.	Protect wilderness qualities as they exist and try to improve (e.g., in heavy use areas).
Flagstaff	1. Recreational experiences. 2. Heritage - walk in pristine areas. 3. Benchmark areas for comparisons.	Keep in as near a natural state as possible over time.	Same as managerial philosophy.
Long Valley	1. Preserve natural area. 2. Escape to the wilderness from cities.	Maintain the wilderness qualities.	Meet the requirements of the Act.
Mormon Lake	1. Untouched area. 2. Preserving areas. 3. Challenge/risk recreation.	If manager follows laws and regulations, those values will be maintained; depending on situation--manage to need.	Meet the terms of the Wilderness Act.
Sedona	1. Natural ecosystem preservation. 2. Solitude, isolated recreation. 3. Assures retention of the resource for itself.	Protect it from unnatural change.	Protection of the resource.
Blue Ridge	1. Solitude. 2. Natural beauty. 3. Diversity of species.	Develop a plan to protect those values; promote minimal impact; be referee between competing uses (recreation, grazing, etc.).	Keep wilderness values intact and still allow level of use consistent with those values.
CORONADO			
Douglas	1. Solitude. 2. Adventure. 3. Spiritual. 4. Natural areas preserved.	Set goals and objectives; have skilled personnel to get the job done.	Protect wilderness resource; enable people to benefit from the resource.
Nogales	1. Solitude. 2. Scenery. 3. Undisturbed plant communities. 4. Self reliance, man vs. nature.	Educate and manage people.	Preserve the resource, protect from encroachment; balance uses with consistency of Wilderness Act.
Safford	1. Solitude. 2. Recreation without conveniences. 3. Natural, undisturbed, pristine area.	Ensure regulations and laws are upheld by using minimal regulations and restrictions.	To comply with the regulations.

Table 2, continued

NATIONAL FOREST Ranger District	Values or Benefits (Rank Ordered)	Managerial Philosophy	Primary Management Obligations of Ranger Based on 1964 Wilderness Act
Sierra Vista	<ol style="list-style-type: none"> 1. Make unchanged areas available to public. 2. Preserve natural area. 	Keep wilderness as it is; protect it in an unobtrusive manner.	Manage wilderness for wilderness' sake; includes everything necessary to do so.
Santa Catalina	<ol style="list-style-type: none"> 1. Preservation of ecosystems. 2. Nondeveloped areas. 3. Feeling of getting away. 	Protect the resource; minimize management for user forecast or predict problems and mitigate them.	Implement and interpret the Act as it applies to the specific wilderness.
GILA			
Black Range	<ol style="list-style-type: none"> 1. Just knowing wilderness exists. 2. Research and information pool. 	As little management as possible with protection of the natural state.	Careful use of a scarce resource.
Luna	<ol style="list-style-type: none"> 1. Opportunity to learn and test primitive skills. 2. Solitude. 3. Hunting and fishing. 	Low key approach; don't interfere with public's attempt for solitude.	Manage and protect designated wilderness areas.
Glenwood	<ol style="list-style-type: none"> 1. Area protected from certain activities. 2. Area to retreat to, use skills. 3. Natural area for recreation and observation. 4. Research study area. 	Be aware of past and present uses; know and apply policy; have wilderness ethic to appreciate wilderness ideals.	Adhere to and maintain principles of the Act.
Mimbres	<ol style="list-style-type: none"> 1. Preservation of a natural area. 2. Solitude. 	Manage to maintain natural processes of wilderness.	Manage for future generations; retain it without heavy use.
Reserve	<ol style="list-style-type: none"> 1. Solitude. 2. Wildlife observations. 3. Escape urban environment. 4. Noncommercial use of land, undisturbed area. 	Manage so visitors can achieve their own personal goals (allow for spectrum).	Provide quality wilderness experience for wilderness users.
Silver City	<ol style="list-style-type: none"> 1. Unchanged natural area. 2. Experience an unchanged area. 3. Benchmark for research. 4. Just knowing wilderness exists. 	Conflicting uses must be minimized to have minimal ecological impact.	Comply with the law; minimize conflicting uses.
Wilderness	<ol style="list-style-type: none"> 1. Measuring stick of unaltered area. 2. Wilderness recreation. 3. Renewable resources such as grazing. 	Ensure wilderness is managed as Congress intended.	Manage use in accordance with Act; keep impacts low.

Table 2, continued

NATIONAL FOREST Ranger District	Values or Benefits (Rank Ordered)	Managerial Philosophy	Primary Management Obligations of Ranger Based on 1964 Wilderness Act
Quemado	1. Research of natural areas. 2. Solitude. 3. Habitat for threatened or endangered species	Permit use to fullest extent without destruction of wilderness.	Maintain a place untrammeled by man.
KAIBAB Williams	1. Recreation in natural area. 2. Self reliant recreation. 3. Preserve plant/animal habitat.	Manage to avoid manipulation by man; disperse use when possible.	Manage for availability vs. manipulation.
Chalender	1. Undisturbed natural areas. 2. Recreation opportunities. 3. Just knowing wilderness exists. 4. Research values.	Carry out agency policy.	Same as managerial philosophy.
North Kaibab	1. Recreational use of wilderness. 2. Retain gene pool for ecosystem. 3. Solitude. 4. Maintain natural area.	Achieve multiple use strategy.	Manage wilderness in as near a natural condition as possible; includes use of natural fires.
Tusayan	1. Preserve natural area. 2. Wildlife habitat. 3. Valuable watersheds.	Maintain wilderness character.	Identify areas with wilderness character; nominate those areas; restrain uses that would diminish wilderness character.
LINCOLN Smokey Bear	1. Just knowing wilderness exists (psychological attributes). 2. Escape every day pressures. 3. Use primitive skills. 4. Therapeutic values.	Behind the scene manager to provide the attributes that wilderness provides.	Provide a natural area with minimal human influence.
Cloudcroft	1. Solitude. 2. Observing undisturbed natural areas. 3. Challenge and risk recreation. 4. Place to get away from urban environment.	Maintain natural condition and protect wilderness attributes.	Manage as the law prescribes.

Table 2, continued

NATIONAL FOREST Ranger District	Values or Benefits (Rank Ordered)	Managerial Philosophy	Primary Management Obligations of Ranger Based on 1964 Wilderness Act
Guadalupe	1. Preservation of an area, large enough to have natural progression.	Preserve in natural state; allow nature to take its course.	Allow public use; control use and impact; let nature take its course.
Mayhill	1. Aesthetics, beauty, uniqueness. 2. Preservation of natural areas. 3. Solitude.	Protect and keep wilderness intact to preserve its wilderness qualities.	Preserve and manage wilderness characteristics without mechanized equipment.
PREScott			
Chino Valley	1. Preservation of natural areas. 2. Have people use wilderness.	Manage people to use wilderness properly without overuse or abuse.	Comply with legislation; manage as was intended.
Bradshaw	1. Individual impact of wilderness on user. 2. Preservation of a natural area.	Maintain and preserve wilderness environment with goals of Wilderness Act.	Maintain integrity of wilderness with Act guidelines.
Verde	1. Challenge and risk recreation. 2. Benchmark for what an ecosystem should be.	Strive to return area to natural ecological state and provide recreational benefits.	Follow the '64 Act with interpretation by Congress.
SANTA FE			
Coyote	1. Baseline for natural conditions. 2. Non-used or pure area. 3. Wilderness experience to get away to.	Keep wilderness area within the intent of the law; regulate use to provide a wilderness experience.	Same as managerial philosophy.
Cuba	1. Don't like wilderness designation, it encourages overuse. 2. Area like Wilderness Act philosophy. 3. Area without man's interference.	Follow the Wilderness Act.	Ensure that we manage it without impacts; man as only a visitor.
Jemez	1. Experience primitive or natural area. 2. Measurement between management and nonmanagement of lands. 3. Get away from people and cities.	A catalyst in directing and providing guidance and establish policies for wilderness users.	Manage existing wilderness to a level that meets the intent of the law.

Table 2, continued

NATIONAL FOREST Ranger District	Values or Benefits (Rank Ordered)	Managerial Philosophy	Primary Management Obligations of Ranger Based on 1964 Wilderness Act
Las Vegas	1. Untouched natural areas. 2. Experience remote area. 3. Solitude.	Manager must know local wilderness characteristics and like the wilderness setting.	Manage according to the law; maintain in the condition it was when law was established.
Pecos	1. Benchmark to let nature rule. 2. Recreational opportunities.	Manage for naturalness of area vs. managing for use.	Maintain as natural as possible.
Tesuque	1. Close to nature, emotional experience. 2. Solitude. 3. Beauty and aesthetics.	Minimal management.	Limit or reduce man-made objects in wilderness; protect resource from irreversible damage.
Espanola	1. Solitude. 2. Escape from human pressures. 3. Challenge recreation. 4. Family recreation experience.	Maintain primitive characteristics with minimal regulations.	Preserve lands for present and future wilderness values.
TONTO		Satisfy recreational demands of the public.	Execute all parts of the Act; manage according to public demands.
Cave Creek	1. Recreational opportunities. 2. Scientific values and comparisons.		Protect and enhance wilderness values.
Globe	1. Preservation of natural area. 2. Just knowing wilderness exists.	Manage an area to enhance the wilderness values by obeying the law.	To meet wilderness objectives in relationship to wilderness spectrum.
Mesa	1. Preservation of natural area. 2. Escape urban environment. 3. Wilderness opportunity. 4. Challenge and risk recreation.	Fit wilderness into "spectrum" and provide opportunities for all under Wilderness Act.	Maintain only those improvements necessary for enjoyment of user and protection of the resource as intended in the Act.
Payson	1. Preserve natural area. 2. Solitude and relaxation. 3. Challenge and risk recreation. 4. Pristine hunting experience.	Manage in concert with the Wilderness Act; multiple use scheme within periphery of Act.	Maintain our existing wilderness in natural condition.
Pleasant Valley	1. Escape urban environment. 2. Wildlife habitat. 3. Ongoing research.	Determine capacity and manage to stay within it.	Manage to achieve objectives in the Act; integrate preservation with multiple use management.
Tonto Basin	1. Preserve nonrenewable resource. 2. Valuable component of multiple use of land resources. 3. Knowing wilderness exists.	Objectives for wilderness should be integral to entire multiple use responsibilities.	

Wilderness: Facilitates or Conflicts with Multiple Use. There is an ongoing debate among administrative officials, resource managers, and writers in the popular press on whether wilderness facilitates or conflicts with the multiple use management goals of the Forest Service (Roggenbuck and Watson 1982). Beliefs on this issue may influence wilderness management practices and adoption of management innovations; therefore, rangers were asked their opinions. Twenty-seven of the 40 wilderness district rangers responded that wilderness facilitates the goals of multiple use management, eight responded that it conflicts, three responded that it does neither and two responded that it does both (Table 3). The 24 rangers without wilderness responsibility were also asked this question. Eighteen responded that wilderness facilitates multiple use management, two responded that it conflicts, three said both, and one reported that it does neither.

Based on the explanations provided, it seems much of the disagreement was over definition of multiple use management as opposed to whether wilderness is an appropriate and/or important component of the spectrum of Forest Service resource provisions. For example, one ranger who said wilderness conflicted with multiple use management explained that domestic cattle and man-made trails detracted from the wilderness experience, therefore multiple use management conflicted with his wilderness philosophy. Another ranger said wilderness conflicted because it is not multiple use (i.e., there are only some multiple uses on wilderness).

TABLE 3

**Contributions of Wilderness to the Goals of Multiple Use Management:
Perceptions of the District Rangers**

NATIONAL FOREST Ranger District	Facilitates or Conflicts with Multiple Use Management	Explanation
APACHE-SITGREAVES		
Alpine	Facilitates	Wilderness management is a part of multiple use management; it's another resource that should be managed as such.
Clifton	Facilitates	For most areas it doesn't, all areas are not suitable for multiple use, some areas are best for individual uses; don't have to do everything on every acre.
Chevelon	Both (depends on use around the wilder- ness)	<u>Facilitates:</u> if certain areas have elements that are best for certain things. <u>Conflicts:</u> if the units of land are not multiple use managed.
Heber	Facilitates	Can't have everything on every acre.
Springerville	Facilitates	Doesn't conflict with other district uses; don't know what else I'd do with the wilderness, the geography limits use to what is being done now.

Table 3, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Facilitates or Conflicts with Multiple Use Management</u>	<u>Explanation</u>
Lakeside	Facilitates	Another use of the full spectrum of recreation.
CARSON		
Canjilon	Facilitates	Needs to be a blend of everything; wilderness is part of multiple use management.
E1 Rito	Both	Some conflict having arbitrary boundaries (e.g., clear cut timber areas in the wilderness); some wilderness areas only have a highest or best use as wilderness.
Jicarilla	Facilitates	Consistent with multiple use concept.
Penasco	Facilitates	Wilderness provides water quality, wildlife, hunting, recreation, so it's mostly multiple use.
Taos	Facilitates	It's an additional use for multiple use.
Tres Piedras	Conflicts	Some of the restrictions, specifically timber and grazing, mining and vehicle use.
Questa	Conflicts	The wilderness areas are surrounded by communities which want development of federal lands for commercial economics, but some people also see the need for wilderness areas, so there is conflict.
CIBOLA		
Mt. Taylor	Facilitates	Wilderness falls within the spectrum of multiple use management objectives and uses.
Magdalena	Conflicts	Don't think land should be locked up and not used for certain purposes if a better use is found.
Mountainair	Facilitates	Ought to be wilderness in some areas.
Sandia	Ambivalent	No logging or grazing in (his) wilderness, it is both--you don't have to have multiple use on every acre.
Black Kettle	Facilitates	Up to the point of having too much wilderness.
Kiowa N.G.	Ambivalent	Wilderness is conflicting with previous management plans but at the same time it's a necessary part of multiple use management.
Rita Blanca	Conflicts	Wilderness policy excludes harvest of resources (range, timber).
COCONINO		
Beaver Creek	Facilitates	No resources in this wilderness that would have been productive; in some areas it conflicts for this reason.
Elden	Facilitates	Consistent with multiple use philosophy.

Table 3, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Facilitates or Conflicts with Multiple Use Management</u>	<u>Explanation</u>
Flagstaff	Facilitates	Because they are wilderness, must manage areas more closely; (Sycamore Canyon and Red Rock-Secret Mtn can only be wilderness--no problems, Kendrick and Kachina could have multiple use on them).
Long Valley	Facilitates	No problems with it on my district, wilderness is another multiple use.
Mormon Lake	Facilitates	They have a place in multiple use scheme; problem is when we pick improper areas.
Sedona	Facilitates	Another special type of use, consistent or coordinated with other uses.
Blue Ridge	Conflicts	Wilderness concentrates recreation use, it precludes or limits other uses; wilderness isn't multiple use, it is single use; wilderness is good and important, it needs support--but it's not necessarily multiple use.
CORONADO		
Douglas	Facilitates	It's a part of multiple use management, doesn't conflict with other goals.
Nogales	Neither	Wilderness is a resource so manage it as just another resource (e.g., timber, grazing resource, etc.).
Safford	Conflicts	Causes minor problems, management is more costly and slower (e.g., unable to use mechanized equipment, no timber harvest, yet there is timber management).
Sierra Vista	Facilitates	It's one aspect of multiple use management; it's the highest or best use for certain areas.
Santa Catalina	Facilitates	Wilderness is one of the resources we manage; it's one of the goals of multiple use management so it doesn't facilitate or conflict.
GILA		
Black Range	Conflicts	Directly and properly, wilderness management is not practical in wilderness and it shouldn't be.
Luna	Facilitates	No valuable timber or minerals; it's good for recreation so, overall, it facilitates goals.
Glenwood	Facilitates	It's a multiple use value, and still has multiple use to some extent in the wilderness.
Mimbres	Both	Law doesn't allow multiple use in wilderness, so it's a bit of both.
Reserve	Conflicts	Man-made trails, lots of people, and domestic cattle detracts from the wilderness experience, so multiple use management conflicts with my wilderness philosophies.
Silver City	Facilitates	Through the benchmark effect.
Wilderness	Neither	Has factors of both, it is used in some aspects of multiple use management.

Table 3, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Facilitates or Conflicts with Multiple Use Management</u>	<u>Explanation</u>
Quemado	Facilitates	Good for relating intensively managed areas to non-managed areas.
KAIBAB		
Williams	Facilitates	It helps multiple use efforts by managing other areas intensely and not managing other areas as much (wilderness).
Chalender	Facilitates	It's part of multiple use management.
North Kaibab	Facilitates	One end of spectrum for multiple use.
Tusayan	Facilitates	It's part of multiple use management.
LINCOLN		
Smokey Bear	Facilitates	It's part of the spectrum; provides certain areas with certain uses, there is emphasis/compromise in all areas.
Cloudcroft	Facilitates	We are obligated to provide wilderness opportunities to the public, only the government can economically afford to provide for wilderness.
Guadalupe	Facilitates	Provides recreation; it is one of the areas of multiple use management.
Mayhill	Facilitates	It's a part of multiple use management.
PREScott		
Chino Valley	Facilitates	You can do the same things on the wilderness as outside without degrading the surface resources.
Bradshaw	Facilitates	It's one aspect of forest management and the public recreational users both need and demand it.
Verde	Facilitates	It's one part of multiple use.
SANTA FE		
Coyote	Facilitates	Doesn't conflict with other multiple uses; it enhances the areas of the district.
Cuba	Facilitates	One of the multiple uses.
Jemez	Facilitates	Gives variety as a part of multiple use management.
Las Vegas	Conflicts	Wilderness isn't multiple use management; can't manage for timber, silviculture, etc.
Pecos	Facilitates	It's another one of the multiple uses; it's another resource.
Tesuque	Facilitates	It's one of many multiple uses.
Espanola	Facilitates	Provided there is a proper balance between different uses.

Table 3, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Facilitates or Conflicts with Multiple Use Management</u>	<u>Explanation</u>
TONTO		
Cave Creek	Neither	Wilderness is set aside under nonmultiple use management.
Globe	Conflicts	It's not multiple use, there are only some multiple uses on wilderness.
Mesa	Facilitates	One of the uses of national forest land.
Payson	Facilitates	Is part of multiple use scheme of Forest Service.
Pleasant Valley	Facilitates	No conflict with other uses of Forest Service.
Tonto Basin	Facilitates	In concert with multiple use.

Nonwilderness as a Separate Backcountry System. Rangers were asked if they think nonwilderness backcountry areas should be placed in a special wilderness or backcountry system which is separate from the National Wilderness Preservation System. Of the 40 rangers with wilderness, 33 responded negatively and seven responded positively (Table 4). Of the 24 nonwilderness district rangers, 19 responded negatively, one said yes, and four were undecided. The most common reasons for the negative responses were: "if it is not wilderness, it is multiple use land and there is need for only these two designations"; "backcountry areas can be managed as such without special designation"; "designation of backcountry areas would advertise them for potential overuse." Those who felt that backcountry areas should be placed in a separate backcountry system were varied in their explanations, from the notion of providing a buffer for wilderness to providing less restrictions on wilderness-type areas. Overall it appears that creation of a separate backcountry system would be unpopular in the Southwest as 81 percent of all 64 district rangers in Region 3 oppose such action.

TABLE 4

Should Nonwilderness Backcountry Areas be Placed in a Special Wilderness or into a Backcountry System which is Separate from the National Preservation System?

<u>NATIONAL FOREST Ranger District</u>	<u>Ranger's Opinion</u>	<u>Explanation</u>
APACHE-SITGREAVES		
Alpine	No	Terrain wise, other areas make themselves backcountry; don't need more than the 3 areas (wilderness, primitive area, normal multiple use).

Table 4, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Ranger's Opinion</u>	<u>Explanation</u>
Clifton	No	It would make those areas wilderness; primitive and backcountry areas are remote enough without the designation.
Chevelon	No	However, forest management plans should take these areas into account.
Heber	No	These areas should be managed on their potential or need; Rare II approach is good, i.e., we might need or want it as wilderness but it's not yet tied in.
Springerville	No	Don't need defacto wilderness areas; you could manage areas differently, but all areas don't need special labels.
Lakeside	No	Would create wilderness within wilderness; adding areas beyond Rare II would not benefit public.
CARSON		
Canjilon	Yes	We have room to manage primitive areas as such without giving them wilderness designations, so give them a separate designation as primitive areas.
El Rito	No	Land is either wilderness or standard lands; adds another class of land that's not necessary for management; would develop more problems than rewards.
Jicarilla	Both	Depends on uniqueness of area proposed.
Penasco	No	Only buffer zones between wilderness and normal areas should be considered to be managed differently.
Taos	No	Don't want controls or restrictive use on backcountry areas; "labels" will encourage more use; can rotate use on backcountry areas (e.g., timber harvest one year, don't harvest next twenty years).
Tres Piedras	Yes	Should be separated in management policy; there is a difference between the two.
Questa	No	Nonwilderness areas are best used by all the public, whereas wilderness areas are used only by certain publics.
CIBOLA		
Mt. Taylor	Not sure	Manage nonwilderness areas for what they are, manage for whatever is necessary or desired; some areas can or cannot be considered for such.
Magdalena	No	Ties up people's hands and ties up land, "labels" would encourage overuse.
Mountainair	No	Need to distinguish, wilderness or nonwilderness, black and white issue with no gray areas.
Sandia	No	Don't need more confusing designations; just do what you want with the area and don't have new designations.
Black Kettle	No	Not necessary for more controls and restrictions; need minimal regulation.

Table 4, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Ranger's Opinion</u>	<u>Explanation</u>
Kiowa N.G.	No	Restrictions are already heavy enough on the public.
Rita Blanca	No	National Wilderness Preservation System is adequate.
COCONINO		
Beaver Creek	Yes	Many Rare II areas could have been managed as a special management zone; less costly for taxpayers than spending money on legislation.
Elden	No	There's a place for managing it differently than heavy use, but not to legislate it a new category.
Flagstaff	No	Wilderness system provides protection for wilderness areas; don't need other areas.
Long Valley	No	We are at the point now that only inaccessible areas are labelled wilderness.
Mormon Lake	No	Backcountry areas of National Forests (other than wilderness) are needed for users, need no further designation.
Sedona	No	Manage it to compliment wilderness; the land management planning and multiple use will take care of it.
Blue Ridge	No	Encourages more use.
CORONADO		
Douglas	No	Could be denying the other potential uses for those areas.
Nogales	No	If it has wilderness characteristics, then it should be wilderness, if not, leave as normal Forest Service lands.
Safford	Yes	To have buffer or "low quality" wilderness, less restrictions but still almost wilderness.
Sierra Vista	No	Let manager manage backcountry areas as such, as long as enough wilderness has been designated; allows for multiple uses of land.
Santa Catalina	No	Perhaps some backcountry areas should have backcountry system, but not all.
GILA		
Black Range	No	National Wilderness Preservation System is adequate for wilderness protection.
Luna	No	Much of backcountry has more solitude than wilderness areas; can manage as backcountry without the wilderness designation.
Glenwood	No	Would create a new land category with management, plans, etc.; a third set of land use.
Mimbres	No	Backcountry won't change drastically due to its physical features; designation won't change the management of these areas much.

Table 4, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Ranger's Opinion</u>	<u>Explanation</u>
Reserve	Yes	Some wilderness type areas should be vegetatively manipulated for increased wildlife, so we need these types of areas.
Silver City	Yes	Visitors can use these selected areas for some of their wilderness needs without wilderness impact.
Wilderness	No	We have enough designated wilderness; need to manage them effectively, then no need for further designation.
Quemado	No	If it is really wilderness, make it one, if not, leave as is; would lead to multiple abuse.
KAIBAB		
Williams	No	If the areas are managed properly there won't be degradation to either wilderness or backcountry.
Chalender	No	We need all types of recreational experiences; so also is a need for all types of areas (primitive-developed).
North Kaibab	Not Sure	A system besides wilderness that provides some multiple uses without development should exist.
Tusayan	No	Wilderness should be wilderness; other areas should be open to multiple use management.
LINCOLN		
Smokey Bear	No	No designation keeps these areas less well known and hence less crowded.
Cloudcroft	No	It's another set of regulations; it should be wilderness or managed intensively.
Guadalupe	No	These areas self regulate via access and terrain.
Mayhill	No	Backcountry areas should be used for a variety of reasons, so the label isn't necessary.
PREScott		
Chino Valley	No	Not necessary, will not receive increased use in near future.
Bradshaw	Not Sure	A plan for separate system is good, but to reevaluate areas would not be practical.
Verde	No	Many of these areas will remain "backcountry" without congressional mandates; allow local manager to determine best use.
SANTA FE		
Coyote	No	The designation of "wilderness" would ruin them.
Cuba	No	It would encourage overuse.

Table 4, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Ranger's Opinion</u>	<u>Explanation</u>
Jemez	No	Not sure if management strategies should be different for different wilderness areas; why have more than one type of wilderness?
Las Vegas	No	The wilderness definition is different than "legal" wilderness; public views these backcountry areas as a wilderness anyway.
Pecos	No	We have designated wilderness, other areas should be used for other things.
Tesuque	No	With designation--over manage, there are normal Forest Service lands that are as good as wilderness and are being used by the public.
Espanola	Yes	Special backcountry is appropriate, although the label sometimes leads to overuse.
TONTO		
Cave Creek	No	It won't be detrimental to not designate them, why advertise the backcountry areas.
Globe	No	Have almost enough wilderness, why advertise backcountry and restrict management alternatives.
Mesa	No	If the area is unique, we can manage it as such.
Payson	No	If no management scheme, its integrity will remain as there won't be a calling card.
Pleasant Valley	Yes	Need some other types of unique status, but not all in wilderness; if we put all the rest in wilderness, would curtail management possibilities of nonwilderness.
Tonto Basin	No	Self protected due to terrain; if we have another management action, it wouldn't be in concert with multiple use--can't maintain it all in pristine state.

WILDERNESS MANAGEMENT PLANNING

Rangers with wilderness on their district were asked to describe the current status of their wilderness management plan. Twenty-six (65%) of the 40 wilderness district rangers had an approved wilderness management plan for at least one wilderness on their district (Table 5). Six of these district rangers were preparing or anticipated preparation of a management plan for an additional wilderness in their district. All wilderness plans were separate documents except for three which were part of the Forest plan. Eleven of the 14 rangers who did not have an approved plan were preparing, or planned to prepare, an implementation plan. Seven would prepare a separate document and four would make it a component of the Forest Plan.

All seven rangers with responsibility for new (1984) wilderness anticipated preparation of an implementation plan; five as a separate document and two were undecided if it would be a separate document or a component of the Forest Plan.

Only 13 (50%) of the rangers who had approved wilderness management plans said they were satisfied with their plan. When asked to identify their level of satisfaction, the results were $\bar{x} = 3.1$ on the five-point likert satisfaction scale (1 = not satisfied, 5 = very satisfied). Seventeen (65%) said it was a useful guide for decision making.

The most common reason for ineffectiveness of the wilderness management plan was that it was outdated. Nine rangers suggested that the plans must be updated, especially to include new additions, in order to enhance usefulness. Six rangers expressed a need for the plans to reflect accurate use levels, trends, problem areas, and predictions. Another concern stated by four rangers was that the plan did not address multiple managers, districts, and/or forests. Three rangers expressed a desire for well defined management guidelines, options, and tasks. One ranger who was not planning to develop an implementation plan suggested that if more funding were available a plan would be useful. Rangers generally agreed that the usefulness of a wilderness plan depends on whether it addresses management guidelines, tasks, and concerns. Several rangers suggested that the key of a good plan would be an inventory of the wilderness. Others felt a need for the plan to outline priorities for future funding and budgeting.

Public involvement was known to have been part of the planning process for ten (38%) of the districts with wilderness management plans. Twelve wilderness district rangers with management plans did not know if the public had been involved. Public input was received primarily through public meetings and by contacting interested parties. All 64 district rangers were queried regarding ideas for public involvement in the wilderness planning process. Contacting interested parties represented 34 percent of all responses and public meetings represented 23 percent of all responses. Newspaper and media advertising, contacting government agencies at all levels, and use of questionnaires to the public and/or users were each suggested by either six or seven district rangers.

TABLE 5
Current Status of Wilderness Management Plan by Ranger District¹

APPRAISE MANAGEMENT PLAN				ANTICIPATED MANAGEMENT PLAN				
NATIONAL FOREST Ranger District	Sep. Doc.	Component of Forest Plan	Useful Guide for Decision Making	Level of Satisfaction ²	Reasons for Satisfaction Level: <u>Suggestions for Improvement</u>	Yes/No Key Elements & Usefulness	Sep. Doc.	Component of Forest Plan
APACHE-SITGREAVES								
Alpine			No				No	
Clifton					Yes; guidelines; impact areas management; people management planning.		X	
Springerville	X		Yes	No (2)	Useful only for general deci- sions, not specifics; outdated, 13 or 14 years old. <u>Suggestions:</u> Need accurate figures, need more specific directions.			
CARSON					Yes; objectives, guide- lines for use and manager- ment practices; identify key problems and appropri- ate management strategies.		X	
Penasco							No	
Tres Piedras	X		Yes	Yes (4)	Areas need improvement. <u>Suggestions:</u> Have difficulty getting range improvements in the wilderness past S.O. and R.O. which are allowed in the wilderness management plan.			

¹ Includes only those districts with wilderness prior to 1984 Arizona legislation.

² 1 = not satisfied; 5 = very satisfied

Table 5, continued

APPROVED MANAGEMENT PLAN							ANTICIPATED MANAGEMENT PLAN			
NATIONAL FOREST Ranger District	Sep. Component of Forest Plan Doc.	Useful Guide for Decision Making	Level of Satisfaction ²	Reasons for Satisfaction Level: Suggestions for Improvement		Yes/No Key Elements & Usefulness	Sep. Doc.	Component of Forest Plan		
				Sep.	Component of Forest Plan					
QUESTA	Approved plan for Wheeler Peak. (No response regarding separate component plan).	Yes	Yes (4)	Needs updating, last updated in 1977; patterns of wilderness use change--requires update. Suggestions: Write plan to help obtain funding in problem areas by allocating money to those areas.	Yes (Latir Peak)	X	X			
MAGDALENA				Yes; set priorities as a basis for funding.	(both separate and component of forest plan)					
MOUNTAINAIR				Yes; visitor use information; traffic patterns; use concentration.	X					
SANDIA				Yes; goals and objectives, day-to-day operations; seasonal uses; boundary lines more specific than forest plan; complement outside recreation facilities and areas.	X					
COCONINO				Yes; establish carrying capacity for the limited useable acres.	X					
BEAVER CREEK				Yes; trail system; signing; threatened plant species; look at high use areas.	X					
EDEN				(New wilderness, 1984)						

Table 5, continued

APPROVED MANAGEMENT PLAN				ANTICIPATED MANAGEMENT PLAN			
NATIONAL FOREST Ranger District	Sep. Doc.	Component of Forest Plan	Useful Guide for Decision Making	Level of Satisfaction ²	Reasons for Satisfaction Level: Suggestions for Improvement	Yes/No & Usefulness	Component of Forest Plan
Flagstaff	X (Sycamore Canyon)		No	No(2)	Not a working tool; it's difficult to use since we have 3 forests managing (Sycamore Canyon) with no money to manage.	Yes; (Kendrick Mtn, Red Rock-Secret Mtn); after forest plan, will develop separate document, identify problem areas and identify how to manage wilderness qualities.	X
X (Kachina Peaks)			Yes	Yes(4)	Needs updating. <u>Suggestions:</u> Address specifically wilderness areas and not include other uses which the plan currently addresses.	Yes; inventory wilderness area, river recreation controls, registration and/or quotas, people management.	X
Long Valley (New wilderness 1984)					No(2)	Several jurisdictions manage the wilderness; responsibilities aren't clearly defined. <u>Suggestions:</u> Specify who does what.	
Sedona		No response regarding separate component plan.	Yes				
CORONADO Douglas			No	No(2)	Old, doesn't address current problems. <u>Suggestions:</u> Have it written by someone acquainted with the wilderness and its problems; integrate it with land management plan; provide problemsolving ideas and flexibility, address specific areas.		

Table 5, continued

Research Findings

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APPROVED MANAGEMENT PLAN				ANTICIPATED MANAGEMENT PLAN			
NATIONAL FOREST Ranger District	Sep. Doc.	Component of Forest Plan	Useful Guide for Decision Making	Level of Satisfaction ²	Reasons for Satisfaction Level: <u>Suggestions for Improvement</u>	Yes/No Key Elements & Usefulness	Sep. Doc. Component of Forest Plan
Nogales (New wilder- ness 1984)				No (3)	10-12 years old; needs up- dating. <u>Suggestions:</u> Simplify it, eliminate some of the restric- tions for the right use.	Yes; describe each area, what is there.	X
Safford	X						
Sierra Vista (New wilder- ness 1984)					Yes; long range plans, definitions of exist- ing conflicts and methods to resolve them.	Could go either way depending on stage of land manage- ment plan.	
Santa Catalina	X		Yes	Yes(5)	It's comprehensive, done by district personnel, at the time it was innovative, it's useable, gives answers to questions. <u>Suggestions:</u> Needs some re- arrangement to avoid assump- tions.		
GILA Black Range	X(Gila a)	No	Yes (3)	Old, uses have changed, fire portion dated, not enough FTE and money. <u>Suggestions:</u> Address expected 5-10 year budget, currently have less money, direct plan to the lower budget.	Yes (Aldo Leopold) will be useful as it is a new wilderness, address need for per- mit system, use dis- tribution, fire con- trol (if not in separate plan), trail maintenance with funding.	X	

Table 5, continued

APPROVED MANAGEMENT PLAN						ANTICIPATED MANAGEMENT PLAN		
NATIONAL FOREST Ranger District	Sep. Doc.	Component of Forest Plan	Useful Guide for Decision Making	Level of Satisfaction ²	Reasons for Satisfaction Level: <u>Suggestions for Improvement</u>	Yes/No & Key Elements & Usefulness	Sep. Doc.	Component of Forest Plan
Luna	X					Yes; straighten out fire policy, trails, signing, grazing, short and long range goals and objectives, tie wilderness elements together.	X	
Glenwood	X		Yes	Yes(5)	Have had little conflict with current uses and direction we wanted to take with respect to the wilderness management plan. <u>Suggestions:</u> Update to include search and rescue, fire management, commercial recreational use.			
Mimbres	X (Gila and Blue Range)		Yes	No(2)	Outdated, doesn't include areas in N.M. wilderness bill. <u>Suggestions:</u> Update to include areas on this district.	Yes (Aldo Leopold); provide standards and guidelines to manage, without restrictions for innovative ideas; set management philosophy regarding levels of use.	X	
Reserve	X (Gila and Blue Range)		Yes	Yes(4)	The plans are good but implementation and improvements are lacking. <u>Suggestions:</u> It's adequate for my administrative job.			
Silver City	X		No	No(2)	Out of date, boundaries changed, addressed problems no longer happening. <u>Suggestions:</u> Update with use zones, use current data from wilderness permits.			

Table 5, continued

Table 5, continued

APPROVED MANAGEMENT PLAN						ANTICIPATED MANAGEMENT PLAN		
NATIONAL FOREST Ranger District	Sep. Doc.	Component of Forest Plan	Useful Guide for Decision Making	Level of Satisfaction ²	Reasons for Satisfaction ²	Yes/No Key Elements & Usefulness	Sep. Doc.	Component of Forest Plan
PREScott								
Chino Valley	X		Yes	Yes (4)	10 years old, needs revision, want more control over management, Coconino has priority. Suggestions: Prescribed burning, noxious plant control (catclaw), update to current wilderness philosophy.	X		
Bradshaw (New wilder- ness, 1984)					Yes; adhere to Wilderness Act, use plan to protect wilderness qualities, visitor use.			
Verde		X	No	No (2)	Not state of the art or budget. Suggestions: Include current state of art management, grazing, wilderness use, role of fire.			
SANTA FE								
Coyote (San Pedro Parks)	X	N/A	Yes (4)	Haven't used it for decision making.	(Chama River Canyon) Yes; describe the wilderness, give guidelines, regulate use, cultural resource guidelines, trail and grazing maintenance.			
Cuba	X		Yes	No (2)	Needs updating (1974). Suggestions: Need public input; modernize the plan to current philosophy and techniques.			

Table 5, continued

APPROVED MANAGEMENT PLAN

NATIONAL FOREST Ranger District	Sep. Doc.	Component of Forest Plan	Level of Satisfaction ²	Reasons for Satisfaction Level: Suggestions for Improvement	ANTICIPATED MANAGEMENT PLAN		
					Yes/No Key Elements & Usefulness	Sep. Doc.	Component of Forest Plan
Jemez	X			Yes; define objectives, resolve conflicts, need common philosophy between Bandelier and Domes; types of resources in the wilderness, carrying capacity.	X		
Las Vegas				Yes; need better standards and guidelines for wilderness management; documentation in plan for funding.		X	
Pecos	X	Yes	No(2)	Out of date. <u>Suggestions:</u> Trails, areas of closure, more recreational use than the plan estimated; need to update it.			
Tesuque	X	No	Yes(4)	Doesn't address multidistrict and multiforest management; only addresses the Pecos and Santa Fe R.D. as they get the money for wilderness management. <u>Suggestions:</u> Address multiple R.D./N.F. situations; funding should come direct from R.O. rather than R.O. to S.O. to R.D.			
Espanola	X	Yes	Yes(3)	Has many suggestions but funding limits implementation. <u>Suggestions:</u> (none).			

Table 5, continued

APPROVED MANAGEMENT PLAN				ANTICIPATED MANAGEMENT PLAN				
NATIONAL FOREST Ranger District	Sep. Doc.	Component of Forest Plan	Useful Guide for Decision Making	Level of Satisfaction ²	Reasons for Satisfaction Level: <u>Suggestions for Improvement</u>	Yes/No Key Elements & Usefulness	Sep. Doc.	Component of Forest Plan
TONTO								
Cave Creek								
Globe	X		No	Yes(3)	Mostly generalities, not for everyday use--it's for future management planning. <u>Suggestions:</u> Specific, with direction for long term uses of certain areas, including a procedure to modify.			
Mesa	X		Yes	No(3)	Outdated (1964), goals and objectives done prior to increased use; it's adequate until land management plan is finished. <u>Suggestions:</u> Identify transportation systems (corridors) with desired levels of use; use and impact measurement; private and commercial balance, livestock guidelines.			
Payson					Yes; in preparation; physiographic description, fire management plan, carrying capacity--especially for commercial use.	X		

Table 5, continued

APPROVED MANAGEMENT PLAN				ANTICIPATED MANAGEMENT PLAN				
NATIONAL FOREST Ranger District	Sep. Doc.	Component of Forest Plan	Useful Guide for Decision Making	Level of Satisfaction ²	Reasons for Satisfaction Level: <u>Suggestions for Improvement</u>	Yes/No Key Elements & Usefulness	Sep. Doc.	Component of Forest Plan
Pleasant Valley	X	Yes	No(3)	Out of date, use is greater now. <u>Suggestions:</u> Gear to visitor management; Tonto N.F. should decide how it should be managed, i.e., access improvement to take slack from Superstitions or keep it with low use.				
Tonto Basin	X	Yes	No(3)	Outdated. <u>Suggestions:</u> Relate more to management prescriptions than historical and ecological information which could be in a separate document.				

TECHNIQUES FOR MONITORING ENVIRONMENTAL CHANGE

The 1964 Wilderness Act calls for preservation of natural conditions in wilderness and the provision of opportunities for primitive and unconfined recreation. All human uses--including recreational use--cause change to the pristine wilderness condition. Therefore, managers must determine what is acceptable change within the definition of the law and monitor that change accordingly. The rangers were asked for information about their monitoring techniques in an effort to identify areas of concern and/or informational need.

Vegetation Monitoring Methods. Twenty-nine (73%) of the wilderness district rangers monitored vegetation (Table 6). Most of these rangers (83%) monitored their vegetation in conjunction with range monitoring and analyses. Casual observation of vegetation conditions by Forest Service personnel when in the field was also a common response. Several rangers used photo points to monitor vegetation. Most of the district rangers (93%) who monitored vegetation were satisfied with their techniques because the monitoring was adequate and/or working well. However, the overall degree of satisfaction was only .7 above average ($\bar{x} = 3.7$). Ten rangers responded that they would like to do more by way of increased monitoring. The most commonly suggested alternatives for monitoring vegetation included use of photo points, transects, observing individual threatened and/or sensitive species, and fuel loading monitoring.

When the 24 nonwilderness district rangers were asked if they do or would monitor vegetation, 89 percent responded positively.

TABLE 6
Vegetation Monitoring Methods
(Includes 40 Wilderness District Rangers)

NATIONAL FOREST Ranger District	Monitoring Method	Level of Satisfaction (1 = not satisfied, 5 = very satisfied)	Alternative Method Considered
APACHE-SITGREAVES			
Alpine	In conjunction with grazing, field inspections.	(4)	More frequent checks.
Clifton	Part of grazing allotments study.	(4)	None.
Springerville	Casual disease and insect obser- vation; also use aerial photos.	(4)	None.
CARSON			
Canjilon	None.		
Penasco	Through range studies.	(4)	None.
Tres Piedras	Range allotment analysis production utilization studies.	(4)	Increase the sam- pling frequencies.

Table 6, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Monitoring Method</u>	<u>Level of Satisfaction (1 = not satisfied, 5 = very satisfied)</u>	<u>Alternative Method Considered</u>
Questa	Through allotment analysis, soil surveys, production utilization studies, some riparian studies.	(5)	Infrared photography.
CIBOLA			
Magdalena	Photo points.	(4)	None.
Mountainair	Range management only.	(3)	None.
Sandia	None.		
COCONINO			
Flagstaff Sycamore Canyon Wilderness	Visual observation by F.S. people.	(4)	None.
Red Rock-Secret Mtn Wilderness	Monitoring for possibility of threatened species; also a natural area is monitored, visual observation.	(4)	Would do more with more money.
Kachina Peaks Wilderness	Monitored by museum of Northern Arizona University for a threatened species.	(4)	Would do more with more money.
Sedona	Range analysis, range is managed a bit more conservatively than outside the wilderness.	(3)	None.
CORONADO			
Douglas	Along with range allotment analyses.	(1)	With patrol people, permittees monitoring.
Safford	With production utilization studies; also regular visual inspection, monitor browse for wildlife and grazing.	(4)	None.
Santa Catalina	None.		
GILA			
Black Range Gila Wilderness	Range analysis, work with district.	(2)	Need more data for natural fire plan; inventory to get baseline data and necessary resources to get vegetation to natural state.
Aldo Leopold Wilderness	As part of range monitoring.	(1)	Inventory to get baseline data and necessary resources to get vegetation to natural state; need baseline and more monitoring.

Table 6, continued

NATIONAL FOREST Ranger District	Monitoring Method	Level of Satisfaction (1 = not satisfied, 5 = very satisfied)	Alternative Method Considered
Luna	Range analysis, transects and photo points, measure every 10 years.	(4)	During prescribed burns take photo points to compare before and after.
Glenwood	None.		
Mimbres	Ocular, also survey timber for insect and disease infestation.	(5)	Use of fire in vegetation methods.
Reserve	Grazing and range studies only.	(4)	None.
Silver City	Range analysis and other casual observations.	(2)	None.
Wilderness	Range analysis, code-a-site, prescribed natural fire monitoring, ranger reports.	(2)	More things done with vegetation type studies with five-year updates.
KAIBAB			
Williams	None.		
Chalender	With range analysis; F.S. visual observation.	(4)	None.
LINCOLN			
Smokey Bear	Monitor grazing, monitoring of browse and herbaceous material.	(3)	None.
PREScott			
Chino Valley	From a range standpoint, visual observation.	(4)	None, inadequate time to monitor more closely.
Verde	None.		
SANTA FE			
Coyote	Grazing allotments only, Parker 3 step.	(4)	Monitor threatened and endangered species, photo points, insect and disease--spruce budworm.
Cuba	Code-a-site inventory, range studies.	(4)	None.
Jemez	Range allotment analysis; periodical range inspections.	(3)	Systematic transect and photo point measuring in all plots, not just grazing areas.
Las Vegas	Range allotment studies and previous vegetation studies.	(4)	None.

Table 6, continued

NATIONAL FOREST Ranger District	Monitoring Method	Level of Satisfaction	Alternative Method Considered
		(1 = not satisfied, 5 = very satisfied)	
Pecos	Casual visual monitoring of meadows for pine invasions.	(4)	None.
Tesuque	None.		
Espanola	None.		
TONTO			
Cave Creek	Grazing analysis	(5)	None.
Globe	Range analysis--conditions and trends.	(5)	Monitor key species more closely.
Mesa	None.		
Payson	Grazing resource production utilization studies, annual inspections (spring, fall) by range staff and sometimes recreation person.	(4)	When using prescribed natural fire, will monitor vegetative response for larger fires.
Pleasant Valley	None (although need to begin doing so, ideal time to begin as degradation is still minimal).		Photo prints.
Tonto Basin	Studies in normal course of range analysis.	(5)	None.

Campsite Monitoring Methods. Campsite conditions were monitored by 32 (80%) of the wilderness district rangers (Table 7). Most of these rangers (73%) monitored by casual observation of Forest Service personnel when they were in the field for other reasons. Ten rangers reported use of WIS or volunteer patrols and five rangers reported wilderness ranger patrol. Three rangers used code-a-site for monitoring purposes, four depended on user feedback for at least part of their monitoring, and one ranger used photo points.

Seven of the wilderness district rangers said they were not satisfied with their campsite monitoring. The overall mean satisfaction score was 3.6. Rangers who were most satisfied generally agreed their system was adequate for current use levels. Unsatisfied rangers stated they would like to do more and three reported their techniques did not give accurate information. Two rangers said they would do more if more funding were available and another stated that based on current budgetary levels, the campsite monitoring was adequate.

When the nonwilderness district rangers were asked if they do or would monitor campsite conditions, all 24 rangers responded positively.

Trail Monitoring Methods. Trail conditions were monitored by 37 (93%) of the wilderness district rangers (Table 7). The most common method for monitoring was periodic inspection through a trail maintenance program. Seven wilderness district rangers reported that the wilderness rangers monitored by visual observation and 15 reported monitoring by volunteers. Feedback provided by users and range permittees was used by some of the wilderness district rangers to monitor trail conditions.

Seven of the wilderness district rangers reported dissatisfaction with their trail monitoring program. The overall mean satisfaction score was 3.7. Those rangers who were satisfied felt that the trail monitoring was adequate for current use levels. Five dissatisfied rangers said they would increase monitoring if more money were available and three stated their system did not give accurate information.

A variety of alternative trail monitoring techniques were suggested; the most common was a simple increase in monitoring by Forest Service personnel and/or volunteers. One ranger suggested helicopter/aerial monitoring.

When the nonwilderness district rangers were asked if they do or would monitor trail conditions, all 24 rangers responded positively.

TABLE 7
Campsites and Trail Condition Monitoring Methods¹

NATIONAL FOREST Ranger District	Campsite Monitoring Method	Campsite and Trail Condition Monitoring Methods ¹			Level of Satisfaction ²	Alternative Method Considered	Level of Satisfaction ²	Alternative Method Considered
		Level of Satisfaction ²	Alternative Method Considered	Trail Monitoring Method				
APACHE-SITGREAVES								
Alpine	Visual observations by F.S. personnel and volunteers.	Yes(4)	More frequent observations; more use of volunteers.	Visual observations by F.S. personnel, volunteers and range permittees.	No(3)	More money and more volunteers for more frequent observations.		
Clifton	Visual observations when in the wilderness for other reasons.	Yes(4)	None.	Visual observations when in the wilderness for other reasons.	Yes(5)	None.		
Springerville	Casual observations by F.S. personnel and volunteers.	Yes(3)	Need more money to do current things more frequently.	Visual observations by F.S. personnel and volunteers.	Yes(4)	None.		
CARSON								
Canonjon	None.			None.				
Penasco	Visual observations by F.S. personnel and volunteers; especially commercial recreation use areas.	Yes(5)	None.	Annual inspection and analysis; wilderness trail plan; get information from wilderness users; visual observations by F.S. personnel.	Yes(4)	More funds.		
Tres Piedras	Observations of campsite areas.	Yes(4)	Wilderness patrol persons.	None.				
Questa	Wilderness ranger observations; written reports; volunteers.	Yes(4)	More frequent monitoring.	Wilderness rangers set up maintenance program; also trail crew chief.	Yes(5)	None.		

¹ Includes only those districts with wilderness prior to 1984 Arizona legislation.

² 1 = not satisfied; 5 = very satisfied

Table 7, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Campsite Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>	<u>Trail Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>
CIBOLA						
Magdalena (Apache Kid) (Withington)	Photo points; observations.	Yes(4)	None.	Maintenance needs survey.	Yes(4)	More frequent ob- servations.
Mountainair	General observations	Yes(3)	None.	Maintenance needs survey.	Yes(4)	More frequent ob- servations.
Sandia	Slight visual observations when in wilderness for other reasons.	Yes(3)	None.	Manual trail maintenance; observations by F.S., personnel and locals.	Yes(3)	More residents, volunteers, and locals tell us about conditions.
COCONINO						
Flagstaff (Kachina Peaks and Sycamore Canyon)	Visual observations.	Yes(4)	If use intensifies, would increase monitoring.	W/S observations; volunteers.	No(1)	Need method for systematic monitoring; have volunteers maintain sign maintenance program.
(Kendrick Mtn. and Red Rock-Secret Mtn.)	None.			Visual observations with written log by volunteers and paid staff.	Yes(4)	None.
Sedona	None.			Make trail inventories every time DR and patrol visit area.	Yes(3)	Need consistent money to maintain trails and keep monitoring up; volunteers or people just to tell them. Problem; don't know everybody that uses the area.

Table 7, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Campsite Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>	<u>Trail Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>
CORONADO						
Douglas	Visual inspection when in the field.	No (2)	Do systematic monitoring system.	Visual inspection.	Yes (4)	None.
Safford	Visual inspection when in the field.	Yes (4)	None.	Visual inspection for soil movement; check permittees; improve bad spots.	Yes (4)	Monitor by wilderness patrol.
Santa Catalina	Casual observations by F.S. personnel.	No (2)	Code-a-site was too complicated.	Volunteer group rides trails, early season hike by F.S. personnel, Arizona hiking club and other public information.	Yes (4)	None.
GILA						
Black Range (Gila)	None.			Trail inventory system by walking trail.	Yes (4)	Total need of each trail is needed, will give better management; need maintenance money to implement monitors.
(Leopold)	None.			Trail inventory system by walking trail.	No (4)	New inventory system being implemented will bring more money.
Luna	Observations by maintenance crews and volunteers.	Yes (5)	None.	Inspect and maintain once a year.	Yes (5)	None.
Glenwood	Know and check the high-use campsites, trail crew and wilderness technician visually check sites.	Yes (5)	None.	Ride trails and maintain when necessary; use professional judgement and repair the worst first.	Yes (5)	Want more monitoring but lack of money hinders that.

Table 7, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Campsite Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>	<u>Trail Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>
Reserve (Gila)	Visual observations by wilderness patrol.	Yes(4)	None.	Visual observation by wilderness patrol; annual on-ground inspection of trails; user input.	Yes(4)	None.
(Blue Range)	None.			None.		
Mimbres	Areas with heavy use—visual observations by staff and observations by maintenance.	Yes(5)	None.	Volunteers provide trail information; fire fighters and public let us know; have extensive trail inventory.	Yes(5)	None.
Silver City	Observations by F.S. personnel and volunteers, letters from concerned users.	No(2)	None.	Periodic inspection, wilderness patrol, volunteers, and public input.	Yes(4)	None.
Wilderness	Code-a-site in heavily used areas, wilderness ranger, observations.	No(4)	Need to follow up on code-a-site more frequently; do all of the wilderness rather than heavily in one area.	Wilderness patrol reports; public comment.	Yes(4)	Need annual review for entire trail.
KAIBAB						
Williams	None.			Visual observations by both volunteers and F.S. people when in area for other reasons.	No(1)	Get more volunteers for real, planned monitoring.
Chalender (Kendrick Mtn)	Visual observations by F.S.	Yes(4)	None.	Yearly inspections; visual observations.	Yes(5)	None.
(Sycamore Canyon)	None.			None.		

Table 7, continued

NATIONAL FOREST Ranger District	Campsite Monitoring Method	Level of Satisfaction ²	Alternative Method Considered	Trail Monitoring Method	Satisfaction ²	Level of Alternative Method Considered	Alternative Method Considered
						Yes(4)	Yes(4)
LINCOLN							
Smokey Bear (Captain Mtn)	F.S. personnel.	Yes(4)	None.	Casual observation; yearly inspection by F.S. personnel.	Yes(4)	Full-time wilderness ranger or annual WIS program.	Full-time wilderness ranger or annual WIS program.
(White Mtn)	WIS person, any time F.S. personnel go in for other reasons.	Yes(4)	None.	Casual observations with WIS and F.S. personnel; yearly inspection.	Yes(4)	Full-time wilderness ranger or annual WIS program.	Full-time wilderness ranger or annual WIS program.
PREScott							
Chino Valley	Taylor cabin (single campsite); registration book, basic information asked.	Yes(4)	None.	Visual inspection, minimal maintenance (district employees, no specialized crews); doesn't cover all trails.	Yes(4)	None.	None.
Verde	None.			Trail inventory.	Yes(3)	None, it's adequate for now.	None, it's adequate for now.
SANTA FE							
Coyote (Chama River Canyon)	Volunteers, wilderness ranger, recreational users find sites and lessen the impacts, visual inspection.	Yes(3)	None.	Visual inspection by volunteers and F.S. personnel.	Yes(4)	Used questionnaire with wilderness users for information.	Used questionnaire with wilderness users for information.
(San Pedro Parks)	Volunteers, trail maintenance crews, visual observations.	Yes(3)	None.	Hike or horseback by volunteers, trail crew, other F.S. people; by visual inspection.	Yes(4)	Used questionnaire with wilderness users for information.	Used questionnaire with wilderness users for information.
Cuba	Code-a-site.	Yes(5)	None.	Visual inspections.	No(2)	If we had money, we could set up regular monitoring; inventory through systematic traveling on trails.	If we had money, we could set up regular monitoring; inventory through systematic traveling on trails.

Table 7, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Campsites Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>	<u>Trail Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>
Jemez	Casual observations by F.S. personnel.	No(2)	Need wilderness management plan and money for guidelines.	Work with volunteers to do monitoring, twice a year inspection and maintenance with volunteers.	No(2)	No alternative at this time.
Las Vegas	Casual observations by F.S. personnel.	No(1)	Need study to indicate problem areas, then method of attack.	Wilderness trail foreman monitors trails, periodic inspection reports from recreational users and permittees.	No(2)	Helicopter; more on the ground inspection.
Pecos	Visually by F.S. personnel, then take action.	Yes(4)	None.	Trail condition surveys annually, then maintain.	Yes(4)	Need more money.
Tesuque	Visual inspection by volunteers and WIS.	No(2)	Code-a-site.	Volunteer and WIS hike most trails--visual inspection.	No(3)	Get more volunteers; need more litter pickup and trail maintenance.
Espanola	Visual inspection.	Yes(3)	Want to establish baseline photo points using volunteers.	Range personnel monitors use, wilderness users feedback, 3-person trail crew for 3 weeks.	Yes(4)	Baseline monitoring on steep trails used for grazing.
TONT0						
Cave Creek (Mazatza)	Routine patrol; visual observations.	Yes(4)	None.	Regularly scheduled maintenance and inspection.	Yes(5)	None.
Cave Creek (Pine Mtn)	Casual observation if in the field.	Yes(5)	None.	Casual observation, some patrol of trail.	Yes(5)	None.
Globe	Casual observations by F.S. personnel.	Yes(5)	If use increased, would increase monitoring, wilderness ranger and/or volunteers could do it.	Ride once per year, both volunteers and F.S. personnel.	Yes(5)	Volunteers if use increased; try to use Mesa wilderness ranger.
Mesa	Casual observation.			Monitor with trail maintenance program.	Yes(3)	Monitor soil drainage and erosion on trail.

Table 7, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Campsites Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>	<u>Trail Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>
Payson	Popular areas--if too many fire rings, restore it; informal monitoring based on need.	Yes(4)	More WIS monitoring.	Visual/informal by foot and horse; wilderness ranger gives description; three volunteers as trail inspectors.	Yes(4)	Increase WIS and volunteer inspection; more wilderness personnel in the field.
Pleasant Valley	One or two horseback inspection trips per year; D.R., R & L staff, and project crew foremen; cover one-half the trails each year.	Yes(4)	Spend more time naturalizing fire rings, no budget now to do that.	Walk in or horse trip; take notes, monitor what trail maintenance has been done to see if it's quality; look at maximum use trails to see if maintenance is adequate; set priorities.	Yes(5)	Not at this time due to limited use; maybe a WIS to log every trail in the wilderness (do we have all the mileage down?); process of making a map.
Tonto Basin	Visual inspection.	Yes(3)	None, low use so monitoring is adequate.	Visual; riding and hiking, periodic condition surveys help define where money goes; feedback from public.	Yes(4)	None, it is adequate.

Air Quality Monitoring Methods. Eleven (28%) of the wilderness district rangers monitored air quality (Table 8). Four rangers used photo points and three rangers reported visual observation either regularly or during fires. One ranger used chemical analysis to monitor air quality and one ranger depended on other governmental agencies for the monitoring.

Ten of the eleven rangers who monitored air quality said they were satisfied with their techniques ($\bar{x} = 3.9$). Eight of the rangers thought their monitoring was adequate and two wanted to do more. One ranger suggested that monitoring of air quality should be done downwind or adjacent to the wilderness. Another ranger suggested that the Forest Service should depend more on other government agencies for air monitoring.

When the 24 nonwilderness district rangers were asked if they do or would monitor air quality, eight (33%) responded positively.

TABLE 8
Air Quality Monitoring Methods*

NATIONAL FOREST Ranger District	Monitoring Method	Level of Satisfaction		Alternative Method Considered
		(1 = not satisfied, 5 = very satisfied)		
APACHE-SITGREAVES				
Alpine	In conjunction with prescribed natural fire plans; smoke, visual observation and compare with weather conditions.	(4)		None; we have a good handle on it.
CARSON				
Questa	Chemical analysis.	(5)		None; chemical analysis works well.
COCONINO				
Flagstaff	As it relates to slash disposal and burning, use photo points.	(5)		None; it is adequate.
CORONADO				
Safford	Visual inspections.	(4)		Don't think they are necessary, as seldom see the pollution from nearby smelter.
GILA				
Black Range	Air lookouts with photo reference points.	(4)		None.

*Includes only those districts monitoring air quality; with wilderness prior to 1984 Arizona legislation.

Table 8, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Monitoring Method</u>	<u>Level of Satisfaction</u>	<u>Alternative Method Considered</u>
Luna	Photo points.	(2)	Monitor more often; use chemical analysis and vegetative responses.
Silver City	Casual observation of prescribed natural fire.	(3)	None; it's satisfactory for now, had offer from state to monitor but don't have FTE to work on it 3 times per week.
KAIBAB			
Williams	Smoke monitoring during burns in areas adjacent to wilderness; use windspeeds, mixing heights, weather patterns.	(4)	None; our monitoring is successful, have had very little smoke go into wilderness.
SANTA FE			
Coyote	Visual only; (only problems are during fires and burns and occasional Four Corners pollution).	(5)	Need a base trend to compare for future impacts.
Cuba	B.L.M. and rain station.	(4)	None, don't know what else we can do.
Espanola	Photo points with scale in the picture done for baseline data.	(2)	Could use Bandelier National Monument and Los Alamos National Laboratory data on Pecos due to vicinity. (Lack of emphasis means lack of funding, we should seek out pollution sources that degrade the wilderness.)

Mineral and Mining Claims Monitoring Methods and Area-Specific Policies. Mineral resources were monitored by 29 (73%) of the wilderness district rangers (Table 9). Most common monitoring procedures included periodic on-site inspections by 16 rangers; checking the B.L.M. claims listing by 14 rangers; and Forest Service operating plan approval by 15 rangers. Several rangers reported monitoring by Forest Service personnel when in the field for other reasons and several made use of permittee feedback. Two rangers monitored with aerial surveillance.

Virtually all of the rangers were satisfied with their monitoring of mineral resources ($\bar{x} = 4.0$). One ranger said he would do more if there were more funding available and three other rangers said they would simply like to do more.

Three wilderness district rangers had a mining and minerals claims policy specific to their wilderness, including Glenwood, Silver City, and Verde Ranger Districts. They were all satisfied with their policy. None of the other wilderness district rangers anticipated adoption of an area-specific policy, although one of the district rangers with a new (1984) wilderness (Bradshaw Ranger District) anticipated adopting such a policy.

When the 24 nonwilderness district rangers were asked if they do or would monitor mineral resources and mining, 20 (83%) responded positively.

Cultural Resources Monitoring Methods and Area-Specific Policies. Cultural resources were monitored by 32 (80%) of the wilderness district rangers (Table 9). The most common means of monitoring, reported by 19 rangers, was visual inspection by Forest Service personnel when in the wilderness for other reasons. Eleven rangers inventoried and recorded known sites. Several rangers reported systematic periodic inspections by the wilderness ranger or volunteer staff. Two rangers reported a survey of the entire wilderness by the forest archaeologist and four rangers said they would like to have such a survey conducted on their wilderness. One ranger reported use of photo points.

District rangers were generally satisfied with their cultural resource monitoring ($\bar{x} = 3.5$) although eight rangers reported they were not satisfied. Rangers that were most satisfied generally agreed that their system was adequate, however, twelve rangers said they wanted to do more and three would do more with more money.

Four wilderness district rangers had a cultural resource monitoring policy specific to their wilderness, including Flagstaff, Glenwood, Wilderness, and Silver City Ranger Districts. They were all satisfied with their policy. Two additional wilderness district rangers (Chalender and Mesa Ranger Districts) anticipated adopting an area-specific policy and three of the seven district rangers with a new (1984) wilderness anticipated adopting such a policy, including Long Valley, Sierra Vista, and North Kaibab Ranger Districts.

When the nonwilderness district rangers were asked if they do or would monitor cultural resource sites, all 24 rangers responded positively.

TABLE 9
Minerals and Cultural Resource Monitoring Methods¹

NATIONAL FOREST Ranger District	Minerals Monitoring Method	Level of Satisfaction ²	Alternative Method Considered	Cultural Resource Monitoring	Level of Satisfaction ²	Alternative Method Considered
APACHE-SITGREAVES						
Alpine	Aerial flights, part of fire monitoring; on-ground inspection if necessary.	Yes(3)	Increase monitoring if activity increased.	Visual inspection in field by volunteers, F.S. personnel, inventory discovered sites.	Yes(2)	Need complete inventory of sites.
Clifton	If people want to do exploratory work, must contact D.O. first.	Yes(5)	None.	Inventory and record as they are found, permittees notify of vandalism to sites.	Yes(4)	With more money could do more.
Springerville	None.	None.		None.	None.	
CARSON						
Canjilon	Standard F.S. policy.	Yes(4)	None.	Casual observation by F.S. personnel; inventory of new sites.	Yes(4)	None.
Penasco	None.			Visual observations when in wilderness for other reasons.	Yes(5)	None.
Tres Piedras	Required mining and mineral claims policy.	Yes(5)	None.	Map of sites, an inventory; wouldn't monitor unless there was a surface disturbance (construction and/or vandals).	Yes(4)	Archaeologists map out all possible sites, survey the area.
Questa	Operating plan, B.L.M. reports, F.S. personnel visual observations.	Yes(5)	None.	Wilderness ranger monitors by visual observation; survey by F.S. archaeologist.	Yes(4)	None.
CIBOLA						
Magdalena (Apache Kid)	Find out who has valid claims through B.L.M. files; spot check valid claims.	Yes(4)	None.	Photo points--historical and old cabins; observation.	Yes(5)	None.

¹ Includes only those districts with wilderness prior to 1984 Arizona legislation.

² 1 = not satisfied; 5 = very satisfied

Table 9, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Minerals Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>	<u>Cultural Resource Monitoring</u>	<u>Satisfaction²</u>	<u>Level of Alternative Method Considered</u>
Magdalena (Washington)	Find out who has valid claims through B.L.M. files; spot check valid claims.	Yes(5)	None.	None.	None.	
Mountainair	Standard F.S. techniques.	Yes(3)	None.	Casual visual observations of sites when in area.	Yes(3)	
Sandia	None.			Inventory sites; seldom visual inspection.	Yes(3)	None.
COCONINO						
Flagstaff	None.			None.		
Sedona	Yes, monitor what's there.	Yes(5)	None (not much activity).	Monitor some, informally.	No(2)	Need better inventory; need to see them more frequently--there are lots of them.
CORONADO						
Douglas	None.			Visual inspection of federal buildings.	Yes(4)	None.
Safford	Claimants voluntarily tell us (visual inspection), also permittees report it.	Yes(3)	Full-time wilderness ranger.	Visual inspection when in the field for other reasons.	Yes(3)	Full-time wilderness ranger; keep track of vandals and people who take things.
Santa Catalina	Mining regulations; procedures, operating permits, etc., no claims currently.	Yes(5)	None.	None.		
GILA						
Black Range	Recreation land staff consults claims with B.L.M.; maintain file on claims; monitor by visual inspection.	Yes(4)	Old system needed to be modified; the new system should work.	Casual inventory during other work roles.	Yes(4)	None.

Table 9, continued

NATIONAL FOREST Ranger District	Minerals Monitoring Method	Level of Satisfaction ²	Alternative Method Considered	Cultural Resource Monitoring	Level of Satisfaction ²	Alternative Method Considered
Luna	If staking is seen, look it up for validity; B.L.M. files, also.	Yes(2)	Update B.L.M. materials (6 mos.- 1 year old); county records are hard to get and field observations are not adequate.	No protection--just record the finds (inventory) through observation.	Yes(3)	Have considered volunteers to inventory and alert F.S. for vandalism; need money to follow up legally to prosecute vandals.
Glenwood	Keep abreast of current claims and working on claims. Use B.L.M. and know where all claims are as of 12/13/83. Visual inspections; communicate with claimants.	Yes(4)	None.	None.	Yes(4)	If had money would do photo prints, sensors, time lapse photos.
Reserve	None, don't have any.			Inventory, look for disturbances; visual inspection in cooperation with permittees and general public.		Aircraft monitoring.
Mimbres	None.			Casual monitoring of inventoried sites (can't emphasize cultural resources monitoring, if not in area for other reason the sites don't get monitored).	No(2)	
Silver City	Operating plans, B.L.M. records, casual observations.	Yes(4)	None.	Wilderness ranger patrol report.	Yes(5)	None.
Wilderness	Wilderness patrol reports, periodic inspections of reports and operating plans.	Yes(5)	None.	Visual observations by F.S. people when in wilderness.	No(2)	Periodic inspections.
KAIBAB	Don't have any yet (keep in communication with and watch one on the edge of the wilderness).	Yes(4)	None.			
Williams						

Table 9, continued

NATIONAL FOREST Ranger District	Minerals Monitoring Method	Level of Alternative Method Considered		Cultural Resource Monitoring	Level of Alternative Method Considered	
		Satisfaction ²	Considered		Satisfaction ²	Considered
Chalender	None.			Yes.	Yes(4)	Survey the area for sites.
LINCOLN						
Smokey Bear	Keep track with B.L.M. and normal notices of intent to operate, environmental studies in conjunction with proposals.	Yes (5)	None.	Casual inspection when near site.	Yes (5)	None.
PRESCOTT						
Chino Valley	None.			Inventory sites.	Yes (3)	Complete inventory as vandalism may be occurring.
Verde	Studies determining mineral claims (who and what).	Yes (3)	None.	Idea of where they exist-- document the location.	Yes (4)	None.
SANTA FE						
Coyote	None.			Visual observations by volunteers and F.S. personnel.	No (2)	Need to complete inventory; put significant sites on national register; more monitoring.
Cuba	None.			Inventory new sites.	Yes (5)	None.
Jemez	Permit system and wilderness requirements.	Yes (3)	None.	Casual visual observations by F.S. personnel.	No (2)	Inventory sites by archaeologists.
Las Vegas	If we find any we monitor them by field inspection.	No (2)	Have to go by the letter of the law.	When they are found we occasionally inspect visually.	No (2)	More personnel for more frequent monitoring.
Pecos	Operating plan monitoring, normal procedures--none currently in the Pecos.	Yes (5)	None.	Visual observations.	Yes (5)	None.

Table 9, continued

NATIONAL FOREST Ranger District	Minerals Monitoring Method	Level of Satisfaction ²	Alternative Method Considered	Cultural Resource Monitoring	Level of Satisfaction ²	Alternative Method Considered
Tesuque	Have a mica claim, annual inspection and assessment, would need a plan of operations if they want to excavate.	Yes(5)	Only have the one claim, no problems.	None; haven't any sites.		
Espanola	F.S. surface resources B.L.M. and other federal subsurface agencies, get data from B.L.M. on mining claims.		None, what we do works well.			
TONTO						
Cave Creek (Mazatza1)	Standard F.S. procedures, B.L.M. studies.	Yes(4)	Inventory existing activity.	Wilderness range patrols.	Yes(5)	None.
(Pine Mtn)	None.			Haphazard monitoring by wilderness ranger.	Yes(5)	None.
Globe	Keep track of B.L.M. records; no active claims now, so no validity checks, no operating plans submitted, check only when in wilderness for other reasons; casual inspection.	Yes(5)	Action of specific proposals.	Casual inspection by F.S. personnel when in wilderness for other things.	Yes(5)	If we had problems--increase surveillance, possible inventory of sites.
Mesa	On-site inspections by F.S. or volunteers, notify claimee with rules and regulations.	No(3)	Need more people to monitor use.	Visual checks.	Yes(3)	Not satisfied with high use degradation; need signs to educate.
Payson	By 1974 regulations (e.g., notice of intent, plan of operation), 95 percent compliance district-wide; B.L.M. microfiche for latest claims filed--go out and look at it.	Yes(5)	None.	Visual; see that [area] not disturbed, law enforcement when digging begins.	No(2)	More personnel to monitor, stiffer penalties, more to felonies--not just misdemeanors.

Table 9, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Minerals Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>	<u>Cultural Resource Monitoring</u>	<u>Level of Satisfaction²</u>	<u>Alternative Method Considered</u>
Pleasant Valley	Uranium miners keep F.S. informed--have trained ecologist out of Westinghouse, it's the only active claim now.	Yes(4)	None at this time.	Trained archaeologist in Forest, in wilderness some inventoried but no monitoring as such--just surveillance for law enforcement; three or four times a year hike into popular cliff dwellings; some stabilization of cliff dwellings.	Yes(3)	Photo points, visit sites more often; reroute trails--have district para-archaeologist study it.
Tonto Basin	Don't have many, monitored by R & L staff, periodic visual inspections, work with companies or individuals on operating plans; standard procedures.	Yes(3)	More staff to cover it; follow mining laws.	Informal, no specific program. When find them, record and report them. Based on public feedback, staff, permittees, law enforcement--when see, report it and district deals with it.	No(2)	More money for level 4 law enforcement to develop program to deal with monitoring system.

Water Quality Monitoring Methods. Water quality was monitored by nine (23%) of the wilderness district rangers (Table 10). Seven rangers reported use of chemical/bacterial analyses and five rangers said that other agencies monitored for them. Only one ranger said he was not satisfied with the water monitoring system; the mean level of satisfaction was 4.1. Several rangers said they would like to do more.

When the 24 nonwilderness district rangers were asked if they do or would monitor water quality, 17 (71%) responded positively.

TABLE 10
Water Quality Monitoring Methods¹

NATIONAL FOREST Ranger District	Monitoring Method	Level of Satisfaction ²	Alternative Method Considered
APACHE-SITGREAVES			
Alpine	Chemical analysis, check potable water sources for purity.	(4)	Increase testing on additional water sources.
Springerville	Chemical analysis is done downstream from wilderness in cooperation with State of Arizona.	(4)	None.
CARSON			
Questa	U.S. Geological Survey studies the high quality mountain streams.	(5)	None.
CORONADO			
Santa Catalina	Sporadic spot samples and cooperate with University of Arizona classes; also scheduled monitoring.	(4)	None.
GILA			
Reserve R.D.	For Gila trout studies only.	(2)	Region 3 stream analysis.
SANTA FE			
Coyote R.D. Chama River Wilderness	Army Corps of Engineers monitors quantity of water; U.S. Fish and Wildlife does water studies as well as New Mexico Game and Fish Dept.	(5)	None.
San Pedro Parks Wil- derness	Quality and quantity measures twice a year in four spots by F.S., also cooperate with New Mexico universities.	(5)	None.
Tesuque	University of New Mexico monitors water, streams, and turbidity when changes of the ski resort impacts on watersheds.	(5)	None.

¹ Includes only those districts monitoring water quality; with wilderness prior to 1984 Arizona legislation.

² 1 = not satisfied; 2 = very satisfied.

Table 10, continued

NATIONAL FOREST Ranger District	Monitoring Method	Level of Satisfaction ²	Alternative Method Considered
TONTO			
Payson	Water testing when needed.	(4)	None.
Pleasant Valley	Hydrologist from Phoenix area if problem arises, have done stream surveys.	(4)	Have monitoring done on all live creeks and streams; stream surveys on major streams.

Wildlife Monitoring Methods and Wildlife Management Objectives.

Wildlife and fisheries were monitored by 21 (53%) of the wilderness district rangers (Table 11). Thirteen of these rangers said their monitoring was done in cooperation with their respective Game and Fish Department and four reported monitoring by the Forest Service biologists. Several rangers reported monitoring of threatened and endangered species, reintroduced species, and hunted or "harvested" species. Casual monitoring by Forest Service personnel in the field for other purposes was also listed by several rangers.

Fifteen of the district rangers said they were satisfied with their wildlife monitoring program, however, the mean satisfaction score was only .3 above average ($\bar{x} = 3.3$). Six rangers said they wanted to do more and four rangers said their monitoring did not give accurate information. Two rangers said they needed a management plan for monitoring wildlife in wilderness.

District rangers were also asked to describe the objectives of wildlife management in their wilderness (Table 11). The most commonly expressed objective was to maintain species diversity (17 rangers). Sixteen rangers identified the need to maintain and increase species diversity and population size. Six rangers wanted to improve the wildlife habitat and five wanted to let nature take its course. Three rangers wanted to reintroduce indigenous species.

Seventeen wilderness district rangers (43%) managed wildlife in wilderness differently than in nonwilderness areas and had a special wilderness wildlife program. Programs were identified as unique in relation to monitoring threatened and endangered species, improving harvested species populations, reintroducing indigenous species, and using different fire management techniques. Eight additional wilderness district rangers anticipated implementing a special wildlife management program in their wilderness.

When the 24 nonwilderness district rangers were asked if they do or would monitor wildlife in wilderness, 18 (75%) responded positively. Twelve (50%) of the nonwilderness district rangers said they would manage wildlife differently in wilderness than in nonwilderness areas.

TABLE 11
Wildlife Monitoring Methods and Wildlife Management Objectives¹

NATIONAL FOREST Ranger District	Wildlife Monitoring Method	Level of Satisfaction ²	Alternative Methods Considered		Objectives for Wildlife Management	Manage Wildlife Differently Than in Wilderness
			3)	More frequent inspections if more funding available.		
APACHE-SITGREAVES	Sporadic monitoring by wildlife biologists, in cooperation with Arizona Game and Fish; casual observations by F.S. people.	(4)	Helicopter observations.	Habitat improvement because of a history of overgrazing.	Habitat improvement because of a history of overgrazing.	No.
Clifton	Deer population studies by Arizona Game and Fish with F.S. people.	(4)	None.	Have no specific direction. Replanted in one creek.	Have no specific direction. Replanted in one creek.	No.
Springerville						
CARSON						
Carjillon	None.			No defined policy as the land is highly inaccessible. Have a "let it be" policy.	No defined policy as the land is highly inaccessible. Have a "let it be" policy.	No.
Penasco	With New Mexico Game and fish; elk, deer counts; monitor introduced species; bighorn sheep, peregrine falcon; also inventory of fisheries; also F.S. personnel monitoring.	(4)	More monitoring.	Maintain viable population without deteriorating the wilderness values.	Maintain viable population without deteriorating the wilderness values.	Yes: more emphasis on maintaining populations and introducing indigenous species.
Tres Piedras	None.			Sustain existing habitat, especially for elk; the same for fisheries and deer.	Sustain existing habitat, especially for elk; the same for fisheries and deer.	Yes: fisheries, stream management; no improvements allowed.

¹ Includes only those districts with wilderness prior to 1984 Arizona legislation.

² 1 = not satisfied; 5 = very satisfied

Table 11, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Wildlife Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Methods Considered</u>	<u>Objectives for Wildlife Management</u>	<u>Manage Wildlife Differently Than in Wilderness</u>
QUESTA (Latir Peak)	Fisheries monitoring and other studies by F.S. biologist; bighorn sheep monitoring.	(4)	None.	Maintain in a quality wilderness habitat.	Yes: to protect bighorn sheep by removing some impact on the sheep.
	Fisheries and bighorn sheep in cooperation with New Mexico Game and Fish.	(3)	None.	Maintain in a quality wilderness habitat.	Yes: to protect bighorn sheep by removing some impact on the sheep.
CIBOLA					
Magdalena				Keep wildlife in a natural state.	No.
Mountainair	None.			Nondetrimental maintenance of the habitat.	No.
Sandia	None.			Need more openings, greater diversity, broadcast vegetation in the openings for deer and turkey, threatened and endangered species (peregrine falcon).	No.
COCONINO					
Flagstaff	Northern Arizona University studies of certain species; Arizona Game and Fish studies of grasses.	(5)	None.	Maintain existing habitat.	No.
Sedona	None.			"Return the natural habitat," reintroduce species that have been lost if can prove they were there.	No.
CORONADO					
Douglas	None.			Keep it as natural as possible, maintain indigenous plants and animals.	No.

Table 11, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Wildlife Monitoring Method</u>	<u>Level of Satisfaction²</u>	<u>Alternative Methods Considered</u>	<u>Objectives for Wildlife Management</u>	<u>Manage Wildlife Differently Than in Wilderness</u>
Safford	Annual report; visual inspections only.	(4)	Remote sensing, infrared.	Stock at optimum level with the habitat that is there.	Yes, less water developments, other facilities are limited on the wilderness; prescribed natural burns.
Santa Catalina	Bighorn sheep--Arizona Game and Fish contract; aerial observations.	(2)	None.	Preserve diversity, natural distribution; diversity and abundance along with natural processes.	Yes, bighorn sheep--protect and increase numbers and range of them.
GILA				Quality wilderness environment; encourage use with minimum impact on wild lands; enhance wild character and eliminate human influence.	
Black Range	Threatened and endangered species; Gila trout.	(5)	Bear and elk air patrol necessary.	To maintain species native to that area.	Yes: no habitat other than Gila trout and threatened and endangered species.
Luna		None.			Yes: prescribed natural fires are allowed.
Glenwood	Gila trout monitoring; also Game and Fish Department supply record sightings; New Mexico Game and Fish Department peregrine falcon studies.	(4)	None. No funding.	Sustain population numbers and diversity that are now present as well as reintroduce threatened and endangered species.	Yes, don't do water developments and vegetative manipulations.
Mimbres Reserve	Gila trout with experiment station with New Mexico Game and Fish Department sampling population, growth, reproduction.	(4)	None.	Manage habitat to sustain or improve populations along with their diversity.	Yes, restrict motorized equipment.
Silver City	Production utilization studies and observations for grazing in cooperation with New Mexico Game and Fish Department for possible reintroduction of Gila trout.	(2)	None.	Maintain current populations.	No.
					Yes: habitat differences, don't use mechanized equipment, or methods in the air.

Table 11, continued

NATIONAL FOREST Ranger District	Wildlife Monitoring Method	Level of Satisfaction ²	Alternative Methods Considered	Objectives for Wildlife Management	Manage Wildlife Differently Than in Wilderness
Wilderness	Wilderness patrol reports; New Mexico Game and Fish Department cooperation on wildlife species and fisheries population numbers.	(3)	None.	To get the wildlife habitat in as near a natural (or stable) condition as possible; work with New Mexico Game and Fish Department in keeping population numbers in balance.	Yes, New Mexico Game and Fish Department to maintain elk populations by increasing our monitoring in the wilderness.
KAIBAB				Preserve habitat and maintain diversity; use a prescribed burn policy.	Yes, no management at all in wilderness.
Williams					No.
Chalender	Spotted owl studies; F.S. biologists doing studies.	(4)	None.	Maintain or enhance wildlife (game and nongame) in the wilderness, also be concerned with rare and endangered species.	
LINCOLN				New Mexico Game and Fish Department manage the game, we manage the habitat; use prescribed natural fire for habitat diversity.	Yes, no manipulation of vegetation for grazing, timber sales.
PREScott					
Chino Valley	Visual observations of wildlife.	(3)	None.	Want to get desert big-horn sheep reintroduced; lack of water limits habitat for wildlife.	No.
Verde	Only trend studies from Arizona Game and Fish.			Let fire assume its natural role; provide for additional habitats.	No.

Table 11, continued

NATIONAL FOREST Ranger District	Wildlife Monitoring Method	Level of Satisfaction ²	Alternative Methods Considered	Objectives for Wildlife Management	Manage Wildlife Differently Than in Wilderness
SANTA FE					
Coyote (Chama River Wilderness)	U.S. Fish and Wildlife Service; threatened and endangered species, river studies, historically indigenous species (bald eagle, bighorn sheep).	(4)	None.	Manage the habitat and visual quality only.	No.
(San Pedro Parks Wil- derness)	New Mexico Game and Fish Department and U.S. Fish and Wildlife Service; threatened and endangered species, historically indigenous species (bald eagle, bighorn sheep).	(5)	None.	Manage the habitat and visual quality only.	No.
Cuba	Visual inspection, B.L.M. range station, production utilization and allotment analysis.	(2)	None.	Uses: 95 percent fish, 5 percent hunting; want to increase or maintain fisheries; maintain elk populations.	Yes, Wilderness Act policy; restocking fisheries with native fish.
Jemez	None.			Elevate resource damages from wild burros to maintain a balanced ecosystem.	No.
Las Vegas	In cooperation with New Mexico Game and Fish Department, cut-throat fish, fisheries' water quality.	(2)	Need to inventory the sites first.	Manage and maintain populations with available habitat.	No.
Pecos	Casual observation, elk population vs. grazing.	(3)	None.	Allow nature to take its course, especially the species there before man's influence.	No.
Tesuque	None.			Maintenance, rather than enhance or decrease.	Yes, no ecosystem enhancement or disenhancement in the wilderness.

Table 11, continued

NATIONAL FOREST Ranger District	Wildlife Monitoring Method	Level of Satisfaction ²	Alternative Methods Considered	Objectives for Wildlife Management		Manage Wildlife Differently Than in Wilderness
				Estimate photo if more time and/or money.	Maintain species diversity; keep large game numbers up.	
Tonto						
Cave Creek	Forest Service biologist does surveys with range management.	(5)	None.	Maintain suitable habitat for all indigenous species.	No.	
Globe	None.		Improve habitat.	Habitat management to levels which meet wilderness objectives and to maintain grazing levels, in line with Arizona Game and Fish Department.	No.	
Mesa	None.			Promote diversity within the indigenous population --make it consistent with other wilderness values.	No.	
Payson	Resident wildlife biologist: goes into wilderness and gives ideas on where to put trails to protect habitat.	(3)	Wildlife census monitoring and distribution if get prescribed natural fire.	Yes, possibly in relation to exotics; would not have them in wilderness; might in nonwilderness.		
Pleasant Valley	None, will be monitoring next year (1985) as part of Tonto Forest Plan implementation.		Need to know if we are monitoring the right species.	Yes: encourage miners to work other than during peregrine falcon nesting time.	No.	
Tonto Basin	None.			Monitor and attempt to get handle on grazing without manipulating vegetation.		

Miscellaneous Environmental Changes. Rangers were asked if they monitored environmental changes in the wilderness other than those previously identified (Table 12). Sixteen rangers responded positively and reported monitoring of the following: insect and disease problems (seven rangers), fuel loading/build-up of vegetation, vehicular intrusions, aircraft intrusions, and fires. Insect and disease problems were monitored primarily by aerial surveillance and aerial photos. On-ground visual inspection was also used. See Table 12 for methods and alternative suggestions for monitoring the other environmental changes.

TABLE 12
Monitoring of Miscellaneous Environmental Changes¹

NATIONAL FOREST Ranger District	Environmental Change Monitored	Method Used to Monitor	Level of Satisfaction ²	Alternatives
APACHE-SITGREAVES				
Springerville	Natural research area and botanical area.	Monitored by University of Arizona and Arizona State University; but receive no information from them.	Yes(3)	None.
CARSON				
Penasco	Insect monitoring.	Aerial flights and on-ground observations.	Yes(4)	None.
Questa	Spruce budworm; annual flight over the area for aerial photos and visual observation; also on-the-ground inspection.	Aerial flights, visual observations, on-the-ground inspection.	Yes(5)	None.
CIBOLA				
Magdalena	Vehicle use.	Patrol or maintenance people stop them.	No(2)	More funding; better monitoring.
COCONINO				
Flagstaff	Insects and diseases.	Visual by aerial photos and plot the problem areas.	Yes(5)	None.
CORONADO				
Safford	Insect and disease control.	Visual inspection in the trees.	Yes(4)	None.

¹ Includes only those districts monitoring environmental changes other than those identified in Tables 6-11; with wilderness prior to 1984 Arizona legislation.

² 1 = not satisfied; 5 = very satisfied

Table 12, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Environmental Change Monitored</u>	<u>Method Used to Monitor</u>	<u>Level of Satisfaction²</u>	<u>Alternatives</u>
GILA				
Black Range (Gila)	Fire history with current fire policy.	Current fire policy.	Yes(3)	Might compare old photos.
Luna	Fuel loading in connection with prescribed natural fire.	Have map with accumulated fuel types.	Yes(4)	If planned ignitions are used in the future, then a better inventory system is needed.
Glenwood	Fires.	Monitor natural ignitions for burn or put out prescription.	Yes(5)	Reevaluate our prescriptions to increase natural fire size (acreage) allowances.
Reserve	Insect and disease control.	Aerial flights.	Yes(4)	None.
Silver City	Fire--prescribed natural fire.	Monitoring, periodic inspections, cooperative studies done with other groups of people.	Yes(4)	Need more funding.
LINCOLN				
Smokey Bear	Insect and disease.	Annual air photos of insect and disease pockets with casual visual inspection for timber.	Yes(4)	None.
PREScott				
Verde	Fires.	Fire occurrence maps, year acreage burned, location.	Yes(4)	In the near future, more monitoring would be needed due to use of fire as management.
SANTA FE				
Coyote (Chama River Canyon)	Vehicular intrusion.	Visual observations by volunteers and F.S. employees.	Yes(3)	Use grazing features (fences, etc) to block intrusions; bring in enforcement officers.

Table 12, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Environmental Change Monitored</u>	<u>Method Used to Monitor</u>	<u>Level of Satisfaction²</u>	<u>Alternatives</u>
Coyote (San Pedro Park)	Spruce budworm in- festation.	Inventory by ground checks, aerial flights, egg mass counts.	Yes (5)	None.
TONTO				
Pleasant Valley	Aircraft over- flights.	Lookout during fire season informs of overflights, work with Air Force, they have moved some flight patterns outside wil- derness.	No (2)	None; problem is they don't follow the charts, im- proves for awhile and then regres- ses; no con- trol over military.

WATER RESOURCE MANAGEMENT

Two wilderness district rangers reported having water resource management policies specific to their wilderness, including the Mimbres and Pleasant Valley Ranger Districts (Table 13). Both rangers were satisfied with their policy, although Pleasant Valley depended on Arizona State University and the experimental forest monitoring. Their funding was being curtailed and the ranger reported that the district would be unable to keep up water measuring facilities. According to the Mimbres district ranger, their water management policy stipulated no manipulation of juniper invasion. Five additional wilderness district rangers anticipated adoption of an area-specific water management policy.

When the wilderness district rangers were asked about the general water resource management policy that now applies to their wilderness, a variety of responses were given. Seven rangers identified the state and federal water laws as the source of their water policy. Six rangers referred to state water laws, four rangers reported the forest policy, five rangers said the regional and national policy, and nine rangers referred to the Forest Service policy/manual in general as the source of their water policies. Several district rangers identified both state and or federal laws in addition to Forest Service policies.

TABLE 13

**Water Resource Management: Description of
Water Resource Management Policy and Suggestions***

NATIONAL FOREST Ranger District	Water Resource Management Policy	Anticipate Adopting Area-Specific Policy?		Suggestions
		Yes/No		
APACHE-SITGREAVES				
Alpine	Use multiple use guide until Forest Plan is approved, maintaining existing facilities.	No	Might put fence or block some water sources to guarantee nonuse by grazing animals.	
Clifton	Adhere to state water rights; normal F.S. policy for wilderness.	No	Might develop more springs for all uses.	
Springerville	State health standards.	No	Might limit use along waterways; change grazing techniques; move parking lot.	
CARSON				
Canjilon	Leave as is.	No	Might develop springs to enhance wildlife within the wilderness spirit.	
Penasco	None.	No	Might monitor heavy use areas for water quality changes (both grazing and human use).	
Tres Piedras	Maintain a quality water resource.	No	Would not have major facilities construction in the wilderness.	
Questa	Federal and state policies.	No	None.	
CIBOLA				
Magdalena	F.S. policy.	No	Might look at types of water development in wilderness.	
Mountainair	National and regional guidelines.	No	None.	
Sandia	If spring gets busted, we fix it; just maintain spring.	Yes	Increase wildlife water sources.	
COCONINO				
Flagstaff	No management of water resources-- just follow state laws.	No	Only if we are forced into it-- monitor human resources.	
Sedona	Wilderness legislation.	No	Might improve available water; if reintroduce bighorns, might put in water improvements.	
CORONADO				
Douglas	Federal, state, regional law and policy.	Yes	If in land management plan.	

*Includes only those districts with wilderness prior to 1984 Arizona legislation.

Table 13, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Water Resource Management Policy</u>	<u>Anticipate Adopting Area-Specific Policy?</u>		<u>Suggestions</u>
		<u>Yes/No</u>	<u>Policy?</u>	
Safford	Standard F.S. directions and regulations.	No	Don't know.	
Santa Catalina	Preserve water in a natural wilderness state without modification and with a minimum of human contamination.	No	None.	
GILA				
Black Range (Gila)	National policy, modified by U.S. Supreme Court case Mimbre's decision, state law takes precedence over reservation policy.	No	Might adopt policy for acquisition of water rights.	
(Leopold)	West half, same as Gila; east half, national policy not encumbered by the adjudicated river system.	No	Might adopt policy for water rights; identify and acquire water use for recreation and maintain stream flow.	
Luna	Bound by court cases and laws which pertain to the area; also range analysis includes water sources.	No	Might increase intensity of fire management to make water more available (make springs more permanent); develop water for camping spots.	
Glenwood	Maintain water quality for public to drink, fisheries and wildlife; take corrective action if necessary.	No	Just maintain springs for public use and keep water quality good.	
Reserve	Follow regional, state and national guidelines.	No	Can't establish water uses because of strict water laws.	
Mimbre's	Don't manipulate juniper invasion.		(Have area-specific policy.)	
Silver City	Consistent with Wilderness Act and state water laws.	No	None.	
Wilderness	Not develop potable water, but to develop and maintain water for grazing and wildlife.	No	Just the nonmanipulation of what currently exists.	
KAIBAB				
Williams	Don't have one.	No	Haven't looked at the possible planning yet.	
Chalender	Forest-wide policies.	Yes	Part of management plan, look at temporary stream use by humans (now used by livestock and wildlife).	
LINCOLN				
Smokey Bear	Regional and national policies.	No	None.	
PREScott				
Chino Valley	Don't have one.	Yes	Water shortages for livestock, wildlife needs attention and water sources.	

Table 13, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Water Resource Management Policy</u>	Anticipate Adopting Area-Specific <u>Policy?</u>		<u>Suggestions</u>
		<u>Yes/No</u>		
Verde	Don't develop water for human consumption; livestock and wildlife supplies have been developed.	No		Include additional water catchment sources for wildlife.
SANTA FE				
Coyote	Let Mother Nature take her course --also use F.S. policy.	No	None.	
Cuba	Won't increase stream temperature or stream pollutants; operating under normal F.S. policy.	No	Don't know.	
Jemez	Forest, regional, and national policy.	No	None.	
Las Vegas	Forest policy.	Yes	Maintain watershed structures and/or possibly reconstruct them; maintain man-made lakes; clean them or raise the spillways to maintain a certain level of water.	
Pecos	Regional and wilderness policies.	No	None.	
Tesuque	Standard F.S. policy.	No	Really don't know.	
Espanola	F.S. manual.	No	Would if a natural catastrophe occurred; would maintain quality surface water for lower elevation use by people.	
TONTO				
Cave Creek	Standard water laws, F.S. policy.	No	No idea.	
Globe	Use the water management plan, state laws.	No	Prescribed burns to increase water yields.	
Mesa	Clean Water Act.	No	Develop water for wilderness use including monitoring.	
Payson	The same both inside and outside wilderness; filing for water user rights with Salt River Project and the state.	No	Don't know.	
Pleasant Valley	F.S. experimental forest headwaters are in wilderness, monitored with Arizona State University; their funding is being curtailed, can't keep up water measuring facilities.		(Presently have area-specific policy in conjunction with Arizona State University.)	
Tonto Basin	Hydrologist in S.O. if needed, call him, mostly reactive; no active monitoring.	No	Better monitoring of the situation so they know what's going on out there.	

SITE MANAGEMENT

Disperse/Concentrate Use. Wilderness district rangers were asked if they have programs to disperse recreational use and 21 (53%) responded positively (Table 14). The most common approach for dispersing use was to inform visitors of alternative areas in the district office (17 rangers). Two rangers mentioned the use of displays in the district office. Four rangers said they dispersed use through general education programs for their users. Two rangers reported use of the recreational opportunity guide/trails handbook. In addition, one ranger had closed trails, one ranger had established new trails, four rangers had established no-camping areas, and one ranger had obtained right-of-ways on adjacent land.

Although 17 rangers said they were satisfied with their program to disperse use, the mean satisfaction score was only 3.5. Seven rangers said they would like to do more with their recreation dispersion program.

When the 24 nonwilderness district rangers were asked if they do or would have programs to disperse recreational use, 20 (83%) responded positively.

The practice of concentrating use was less popular. Only six wilderness district rangers reported such a program (Table 14). Two rangers said they had sacrificed certain areas to high use and two rangers reported the purposeful establishment of fire rings to concentrate use. One ranger said that he maintained certain trails better than others, another ranger said he closed trails, and another ranger reported establishment of no-camping areas. One ranger concentrated use by offering suggestions to hikers through permit system contact. Most of these rangers were quite satisfied with their use concentration program. However, one ranger expressed a need for determining whether dispersion or concentration is better for specific areas.

When the 24 nonwilderness district rangers were asked if they do or would have programs to concentrate recreational use, only seven (29%) responded positively.

Revegetate or Refurbish Sites. Attempts to revegetate or refurbish wilderness use impact sites were reported by 14 (35%) of the wilderness district rangers and two additional rangers anticipated doing so (Table 14). Five rangers reported scarifying the soil and reseeding with native seeds and plants, with one ranger reseeding by aircraft. Four rangers closed impacted areas to allow for natural recovery. Seven rangers removed fire rings and several mentioned removal of trash as a form of refurbishing sites. Four rangers eliminated nonconforming structures. One ranger said he had commercial recreation outfitters refurbish their sites.

Only two of these wilderness district rangers said they were not satisfied with their refurbishing program ($\bar{x} = 3.6$). Five rangers said they would like to do more. The wilderness district rangers who had not revegetated or refurbished sites were asked what approach they would use if they were to do so. Seventeen rangers said they would scarify the soil and reseed with native seeds. Ten rangers said they would close impacted areas and allow for natural recovery.

When the 24 nonwilderness district rangers were asked if they do or would revegetate or refurbish wilderness use impact sites, 20 (87%) responded positively. The most common potential methods of revegetation listed by these rangers included scarifying the soil and reseeding with native plants and/or closing impacted areas to allow for natural recovery.

Disposal of Human Waste. Programs or facilities to ensure proper disposal of human waste (excrement) in the wilderness were reported by 30 (75%) of the wilderness district rangers and one additional ranger anticipated developing such a program. Distribution of the regional brochure or other Forest Service literature which addresses proper disposal of human waste was reported by 27 (90%) of these rangers. Fifteen rangers (50%) said they informed users of proper techniques through their visitor education programs. Four rangers said that WIS contacts, volunteer contacts, and wilderness ranger contacts effectively informed visitors. Two districts used the common pit toilet. The Smokey Bear Ranger District had one pit toilet which the ranger was satisfied with, based on the limited use. The Sedona district ranger reported one pit toilet at the Taylor Cabin Historic Site and would also like a pit toilet at the trailhead.

Most wilderness district rangers said they were satisfied with their programs or facilities to ensure proper disposal of human waste ($\bar{x} = 3.8$). Only three rangers reported dissatisfaction with their program.

TABLE 14
Site Management: Programs to Disperse/Concentrate Use and Revegetate or Refurbish Impact Sites*

NATIONAL FOREST Ranger District	Program to Disperse Use	Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)	Program to Concentrate Use	Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)	Program to Revegetate/Refurbish	Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)
					Revegetate/Refurbish	Satisfaction/Why (1=not satisfied; 5=very satisfied)
APACHE-SITGREAVES	When people visit D.O., suggest alternative areas.	Yes (3). It is adequate.	None.	None.		
	Limit on group sizes; camp on different spots if over seven people per site.	Yes (3). Unsure if program works.	Yes. Sacrifice campsites by asking people to use certain areas.	No (3). Need to decide if dispersion or concentration is better for specific areas.		
CARSON	Suggest alternate routes and entry points; trail maintenance-maintain old trails if necessary or reduce use by not maintaining.	No (2). Doesn't seem to be working; not consistent enough.	Yes. By maintaining certain trails better.	Yes (4). Only one year old, will work better as it gets going.		
	Recreational opportunity guide, people in D.O. ask for certain areas.	Yes (4).	None.	Yes (3). Low use levels--adequate, can always do better job.	Yes. Elevate bogs on some trails, scatter fire rings, remove conforming campsite structures.	
Questa (Columbine-Hondo and Latir Peak)						

* Includes only those districts that are actively involved in site management, with wilderness prior to 1984 Arizona legislation.

Table 14, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Program to Disperse Use</u>	<u>Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)</u>	<u>Program to Concentrate Use</u>	<u>Program to Revegetate/Refurbish</u>	<u>Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)</u>
Questa (Wheeler Peak)	Recreational opportunity guide, people in D.O. ask for certain areas.	Yes (4). Would consider more access points.	Yes, closure at some campsites, use signs.	Yes. Change camping areas, close areas, reseeded, use drainage structure.	Yes (4). Good realistic solutions.
CIBOLA					
Magdalena	Suggest alternatives through personal contact at office and in wilderness.	Yes (4). Good for now.	None.		
Mountainair	None.		None.	Yes. Volunteers scattered fire rings.	Yes (3). Light use levels, only required this.
Sandia	Personal contact at D.O., WIS in field, trails guidebook.	Yes (4). People who want the remote areas educate themselves.	None.		
COCONINO					
Sedona	By limiting day use in one area.	Yes (2). Satisfied to the extent we're able to enforce it.	None.		
CORONADO					
Douglas	Suggest campsites to office visitors.	Yes (3). Could be better.	None.	None.	
Santa Catalina	None.		Yes. Leave certain fire rings in place to encourage use.	Yes (4).	Yes (5). Very effective.

Table 14, continued

NATIONAL FOREST Ranger District	Program to Disperse Use	Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)	Program to Concentrate Use		Satisfaction/Why (1=not satisfied; 5=very satisfied)	Program to Revegetate/Refurbish	Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)
GILA							
Black Range (Gi1a)	Suggest areas of light use; contact by permit system.	Yes (3). Intensive as we can handle now, not above acceptable use levels.	None.	None.			
Glenwood	Word of mouth-- when people ask.	Yes (4). Satisfied, but some areas are still concentrated.	None.	None.			
Reserve (Gi1a)	Dispersement when requested in D.O.	Yes (4). Good for current levels of use.	None.	None.			
Mimbres	Personal contact at district office and a bit in the field.	Yes (5). Adequate present use levels.	None.	Yes. Removal of nonconforming structures.	Yes (5). Worked well.		
Silver City	Trailhead locations, personal suggestions of alternative routes.	No (3). Need better publicity promotion for dispersed use.	None.	Yes. Refurbish trails, haul out trash and nonconforming structures.	No (2). Could and should do more.		
Wilderness	Information services through visitor education programs plus trail management plan and field contacts.	Yes (4). Been very effective.	Yes. Will leave certain fire rings and campsites in order to keep other campsites and fire rings from being started.	Yes (4). We are doing a good job.	Yes (4). Need more of it, also provide trowels at visitor center (NPS).		

Table 14, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Program to Disperse Use</u>	<u>Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)</u>	<u>Program to Concentrate Use</u>	<u>Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)</u>	<u>Program to Revegetate/Refurbish</u>	<u>Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)</u>
KAIBAB						
Challenger (Kendrick Mtn)	Through forest-wide dispersed management plan, trail construction, parking facilities.	Yes (4). It's sufficient for current and anticipated use levels.	None.	Yes. Erosion and over-use on trail, relocated it, refurbished the old sections.	Yes (5). Did a good job and recovered well.	Yes (5). Did a good job and recovered well.
LINCOLN						
Smokey Bear	Direct them to less accessible areas if they want less people sighting.	Yes (4). Based on limited access that we have.	None.	Yes. Improperly located trails--fill in with brush, refill in with dirt; fire ring scattering.	Yes (4). Based on use and impact, it is okay.	Yes (4). Based on use and impact, it is okay.
PREScott						
Verde	None.	None.	None.	Yes. At entrances construct outhouses, built corral.	Yes (2). Would like to do more.	Yes (2). Would like to do more.
SANTA FE						
Coyote	None.	None.	None.	Yes. Scatter fire rings, take down temporary corral facilities.	Yes (5). Good for current use levels.	Yes (5). Good for current use levels.
Cuba	Tell users alternative routes in the wilderness.	Yes (5). Wilderness is lightly used, don't get much impact.	None.	None.	No (2). Only a bandaid operation.	No (2). Only a bandaid operation.
Las Vegas	Signs in wilderness and at trailheads; D.O. and in the wilderness contacts.	No (2). Not effective, not enough contact.	None.	Yes. Had commercial recreation operators refurbish site by taking out garbage, wipe out fire rings, cut down vandalized trees, no reseeding.	Yes. Had commercial recreation operators refurbish site by taking out garbage, wipe out fire rings, cut down vandalized trees, no reseeding.	Yes. Had commercial recreation operators refurbish site by taking out garbage, wipe out fire rings, cut down vandalized trees, no reseeding.

Table 14, continued

NATIONAL FOREST Ranger District	Program to Disperse Use	Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)		Program to Concentrate Use	Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)	Program to Revegetate/Returbish	Level of Satisfaction/Why (1=not satisfied; 5=very satisfied)
		Satisfied	Why				
Pecos	Through permit system we suggest areas to camp.	Yes (4). Still major popular areas that get over-use; as good as we can do with current program.	Yes. Through permit system contact.	Yes (4). Mostly going where we suggest.	Yes (4). Mostly going where we suggest.	Yes. Closed to overnight camping on signs, maps, permits --natural recovery; no other manipulation.	Yes (4). That's all that's necessary in most areas.
Tesuque	No camping within 500 feet of lakes.	Yes (4). It was necessary, we are recovering.	None.	None.	None.	None.	None.
Espanola	Camping (lake basins closing), trail preference (recommendations).	Yes (3). Only partially successful due to trailhead vandalism at remote trailheads.	None.	Yes (3). Only partially successful due to trailhead vandalism at remote trailheads.	Yes. Reseeded areas with grass seed if trail foreman thinks it necessary.	Yes. Reseeded areas with grass seed if trail foreman thinks it necessary.	Yes (4). Other areas need work as well, lack of monitoring on previously seeded areas.
Tonto	Recommend at trailheads.	Yes (3). Some people only want to go (predetermined) to certain area; lack of monitoring power.	None.	None.	Yes. Reseed and close parallel trails; pick up trash and remove fire rings at campsites.	Yes (3). Lack of alternatives.	Yes (3). Lack of alternatives.
Mesa							

GRAZING MANAGEMENT AND GRAZING POLICY

Thirty-four (85%) of the wilderness district rangers monitored grazing and range allotments by using the standard Forest Service procedures (Table 15). One of these rangers also reported use of range riders. Virtually all district rangers who monitored grazing and range allotments said they were satisfied with the monitoring, although seven district rangers said they would like to do more monitoring. The mean satisfaction score for the 34 wilderness district rangers was very high ($\bar{x} = 4.2$).

TABLE 15
Grazing Management: Description and Evaluation of
Grazing Management Policy*

NATIONAL FOREST Ranger District	Grazing Monitoring Method	Level of Satisfaction		Explanation of Satisfaction Level (1=not satisfied; 5=very satisfied)	Alternative Method Considered
		(1=not satisfied;	5=very satisfied)		
APACHE-SITGREAVES					
Alpine	Normal F.S. analysis.	Yes (4)	Good handle on it.	More frequent.	
Clifton	Production utilization studies; range analysis; biannual inspections (visual-in-the-field).	Yes (5)	Serves our needs; no problems.	None.	
Springerville	Adjust numbers and season of use based on when recreational uses will be in the wilderness production utilization studies, range analysis.	Yes (4)	Sufficient for our problems.	None.	
CARSON					
Canjilon	Standard F.S. policy.	Yes (4)	Small amount of grazing allotments.	None.	
Penasco	Normal F.S. procedures.	Yes (4)	Lack of real use levels--it looks okay, but we don't have stocking yet; need to monitor bighorn sheep grazing patterns with cattle grazing.	More bighorn sheep grazing monitoring.	
Tres Piedras	Range analysis; production utilization studies; range inspection.	Yes (5)	Can't be more intense; getting good reports on the allotment.	None.	
Questa	Normal F.S. procedures.	Yes (5)	Systems allow us to get a good idea of grazing for better management.	None.	
CIBOLA					
Magdalena	Range inspections, range inventories; production utilization studies; range analysis.	Yes (4)	Techniques are a bit time consuming; need to do it quicker and more often.	None.	

*Includes only those districts with wilderness prior to 1984 Arizona legislation.

Table 15, continued

NATIONAL FOREST Ranger District	Grazing Monitoring Method	Level of Satisfaction		Explanation of Satisfaction Level	Alternative Method Considered
		(1=not satisfied; 5=very satisfied)			
Mountainair	Standard F.S. techniques.	Yes (4)	The range system does a good job in conjunction with wilderness.	None.	
Sandia	None.				
COCONINO					
Flagstaff (Kachina Peaks and Sycamore Canyon)	Standard F.S. techniques.	Yes (4)	It looks okay; don't see any problem.	None.	
(Kerrick Mtn and Red Rock- Secret Mtn)	Standard F.S. techniques.	Yes (3)	Adequate.	None.	
Sedona	Range inspection; range analysis; production utilization studies.	Yes (5)	Good management plan that includes the area and cooperative permittees.	None.	
CORONADO					
Douglas	Parker three-step transects, vegetation trends and typing; allotment analysis; production utilization studies; range inspections.	Yes (4)	Could be improved if necessary.	Wildlife vs. grazing analysis; riparian area grazing monitoring; set up study areas for generalizing samples to the whole wilderness.	
Safford	Production utilization studies; an animal inspection per year with permittee.	Yes (4)	Gives us a good idea of what's out there; new people with F.S. need to get visual estimates in proper perspective because they're new.	None.	
Santa Catalina	None.				
GILA					
Black Range	Annual range inspection and allot- ment analysis process.	Yes (4)	They are effective.	None.	

Table 15, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Grazing Monitoring Method</u>	<u>Level of Satisfaction (1=not satisfied; 5=very satisfied)</u>	<u>Explanation of Satisfaction Level</u>	<u>Alternative Method Considered</u>
Luna	Range analysis; allotment analysis; annual inspections; production utilization analysis.	Yes (5)	It's adequate.	None.
Glenwood Reserve	Standard F.S. procedures.	Yes (4)	Range analyses are up-to-date and good for our degree of management.	Possibly different management techniques.
Mimbres	Grazing analysis; management plans; range inspection; production utilization studies.	Yes (5)	Does a good job of keeping grazing in line.	None.
Silver City	Production utilization studies; grazing analysis; permittees; periodic visual inspections.	Yes (4)	Established procedures; works well if you can do it.	None.
Wilderness	Analyses and inspections; transportation routes.	Yes (5)	A good tool since grazing is an exception to wilderness use.	None.
KAIBAB	Williams	None.		
Chalender (Kendrick Mtn)	Normal F.S. procedures.	Yes (4)	Don't think we need to do more.	Monitor springs for possible human use.
LINCOLN	(Sycamore Canyon)	None.		
Smokey Bear	Production utilization studies; allotment inspections; once every four years--inspected.	Yes (4)	Conditions are being maintained; no problems.	None.
PRESCOTT	Allotment analysis; yearly inspections; utilization studies.	Yes (4)	Lack of time, money and personnel.	None.
Chino Valley				

Table 15, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Grazing Monitoring Method</u>	<u>Level of Satisfaction</u> (1=not satisfied; 5=very satisfied)	<u>Explanation of Satisfaction Level</u>	<u>Alternative Method Considered</u>
Verde	Range inspections; production utilization studies; range analysis (once every 15 years).	Yes (4)	It does a good job. Livestock has the most impact so we direct our attention to them.	None.
SANTA FE				
Coyote (Chama River Canyon)	Normal F.S. procedures.	Yes (3)	Don't do too much monitoring.	Use of fencing, types of fence, herders.
(San Pedro Peaks)	Production utilization studies on the whole wilderness with an environmental impact statement as well as normal F.S. actions.	Yes (3)	Study was extensive and actions from study take a long time to implement; it was just an inventory.	Use of fencing, types of fence, herders.
Cuba	Production utilization studies; range allotment analysis in grazing handbook.	Yes (4)	Systems are good but not at 95 percent confidence level.	None.
Jemez	Normal F.S. systems; production utilization studies; range analysis and inspections.	Yes (4)	Have a good handle on vegetative trends.	Riders for distribution procedures in the allotments.
Las Vegas	Standard F.S. practices.	Yes (4)	Methods are adequate.	Different grazing system only.
Pecos	Production utilization studies; range studies (all normal types of F.S. monitoring) plus range rider (hired by permittees) to limit fences and impact areas.	Yes (5)	Range management here is progressive and aggressive because of close monitoring--hence no problem.	
Tesuque	None.			
Espanola	Measured forage to determine grazing numbers, so ten years ago numbers were reduced; production utilization studies will be done in next three to four years.	Yes (5)	Doing what needs to be done.	Doing them more frequently.

Table 15, continued

NATIONAL FOREST Ranger District	Grazing Monitoring Method	Level of Satisfaction		Explanation of Satisfaction Level	Alternative Method Considered
		(1=not satisfied; 5=very satisfied)	(1=not satisfied; 5=very satisfied)		
Tonto					
Cave Creek	Standard F.S. procedures.	Yes (5)	It's doing a good job.	None.	
Globe	Normal F.S. policy and emphasis on riparian environment.	Yes (4)	After the management plan is finished the monitoring of the allotments may not be high enough.	None.	
Mesa	Annual grazing plan with permittee, allotment management plan as guideline, enforce policy.	Yes (4)	Because of workload, can't monitor as frequently as needed.	None.	
Payson	Production utilization studies every four years for whole district; ride-through inspections on each allotment once per year.	Yes (4)	"Know where we are"; the monitoring provides necessary support to back up decision-making process--e.g., stocking levels, improvement needs.	None.	
Pleasant Valley	Range analysis studies; intensive study of ecologic condition of vegetation and livestock forage consumption--no serious overgrazing now; used soil scientist and wildlife biologist in one allotment.	No (2)	Not enough personnel to do check monitoring; lack range personnel to do the studies.	Trained individual to do the studies.	
Tonto Basin	Go through standard range analysis process.	Yes (5)	It is working; procedures are simple enough for us to make progress and provide information needed to make management decisions.	None.	

Nine (23%) of the wilderness district rangers had a grazing/range allotment policy specific to their wilderness. They were all generally satisfied with their policy. Five additional district rangers anticipated adopting a special grazing and range allotment policy for their wilderness. When the district rangers were asked to describe their area-specific policy, several rangers said they did not have grazing, one ranger referred to ranger riders with the herd, and two rangers attempted to separate grazing and recreation use. Complete descriptions of the policies and explanations for level of satisfaction are shown below.

<u>Ranger District</u>	<u>Description</u>	<u>Satisfied</u>
Mesa	Outlined in grazing regulations for wilderness, compatible with Wilderness Act, grazing intensity is not as heavy in wilderness.	Yes (5), allows industry to graze within wilderness guidelines; it is good and works--few gray areas.
Tesuque	No grazing on all allotments in the district; there are no allotments in the district.	Yes (5), cattle are not appropriate in wilderness.
Pecos	Allotment plans are specific to the wilderness; use range rider to move cattle.	Yes (5), no problems.
Verde	Constrained in use of mechanized and motorized equipment; grazing intensity levels are 5-10 percent lighter than in other areas.	Yes (4), it is better now than in past, now we can do what the law wants us to do--we can manage at an ecologically sound level.
Luna	An environmental analysis for one allotment in the wilderness; preserve wilderness character and keep grazing away from recreational use.	Yes (4), write-up, follow-ups, and approvals are slow.
Glenwood	No grazing; area is not suitable.	Yes (5), the wilderness has rough topography for grazing so it is not compatible with other wilderness uses.
Santa Catalina	No grazing; area is not suitable.	Yes (5), reflected in on-ground conditions.
Sandia	No grazing by law.	Yes (5), eliminates the management problem of recreation users versus grazing.
Springerville	Adjust numbers and season of use based on when recreational users will be in the wilderness.	Yes (3), could split up allotments better and allow both cattle and recreation users to use water areas without conflicts.

The wilderness district rangers without an area-specific grazing policy were asked what general policy applied to their wilderness. There were a variety of responses, including the general Forest Service manual/policy; the Wilderness Act; the forest, regional, and/or national policy; and allotment management plans.

FIRE MANAGEMENT AND AREA-SPECIFIC POLICY

Area-specific fire management policies were reported by 18 (45%) of the 40 wilderness district rangers (Table 16). Eighteen additional wilderness district rangers anticipated adopting such a policy. Only four wilderness district rangers did not anticipate adopting an area-specific policy.

The wilderness district rangers with an area-specific fire policy were asked to describe their policy, and 14 reported the use of prescribed natural fire (PNF). Two districts also used planned ignitions and two district rangers said they suppressed only human-caused fires.

Twelve of the 18 wilderness district rangers with an area-specific fire policy said they were satisfied with their policy ($\bar{x} = 3.6$). Nine of the 18 district rangers wanted relaxed prescriptions in their fire policy. Four district rangers wanted to add planned ignitions and two wanted to add PNF. Seven district rangers reported that their policy was adequate and/or working well.

The wilderness district rangers who anticipated adopting an area-specific fire management policy were asked what type of policy they might adopt. Ten district rangers reported that they would implement PNF only, while six district rangers identified both PNF and planned ignitions as part of their potential fire policy.

When the 24 nonwilderness district rangers were asked if they do or would have an area-specific fire management policy, 21 (87%) responded positively. Eight nonwilderness district rangers said they would consider both PNF and planned ignitions, while six would consider PNF only.

TABLE 16
Fire Management: Description and Evaluation of Fire Management Policy¹

NATIONAL FOREST Ranger District	Area Specific Fire Management Policy	Level of Explanation Satisfaction ² of Satisfaction Level	Anticipate Adopting Area Specific Policy and Suggestions	
			Alternatives Considered	General Fire Management Policy
APACHE-SITGREAVES				
Alpine	Yes; prescribed natural fire (PNF) plan with monitoring.	Yes (4)	Would like to see it expanded to include the whole Blue Range primitive area and also have broader, more relaxed prescriptions.	Planned ignitions.
Clifton	Yes; PNF.	No (3)	Want larger, more liberal prescriptions.	Consider a forest-wide fire management policy.
Springerville	None.			Put out all fires during high fire danger; monitor fires in low danger areas with a cost effective analysis.
CARSON				
Canjilon	None.			Put out all fires without mechanized equipment unless with approval; standard F.S. policy.

¹ Includes only those districts with wilderness prior to 1984 Arizona legislation.

² 1 = not satisfied; 5 = very satisfied

Table 16, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Area Specific Fire Management Policy</u>	<u>Level of Explanation² of Satisfaction Level</u>	<u>Satisfaction² of Satisfaction Level</u>	<u>Alternatives Considered</u>	<u>General Fire Management Policy</u>	<u>Area Specific Policy and Suggestions</u>
Penasco	None.				Regional guidelines--put out most, a somewhat prescribed natural burn.	No. Might have PNF.
Tres Piedras	None.				Firefighting equipment restrictions; currently put out all fires.	No. Might have PNF.
Questa	None.				Put out all fires.	Yes. Let burn policy on portion of the wilderness, PNF.
CIBOLA					F.S. fire policy.	Yes. Let fire resume a role under wilderness; under certain conditions, fire might not be put out; PNF.
Magdalena	None.				Attack and put out all fires.	Yes. Will be part of the land management plan initially--a PNF, possibly planned ignition later.
Mountainair	None.					
Sandia	Yes. If it starts, put it out.	No(1)		It doesn't fit in the wilderness role, they should be natural.	PNF will be happening in (1) inventory areas, (2) inventory characteristics, (3) also planned ignitions.	
COCONINO						
Flagstaff	None.				Suppress all fires.	No. Suppress the fires faster since the fires could quickly spread to adjacent areas.

Table 16, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Area Specific Fire Management Policy</u>	<u>Level of Satisfaction² of Satisfaction Level</u>	<u>Explanation of Satisfaction Level</u>	<u>Alternatives Considered</u>	<u>General Fire Management Policy</u>	<u>Area Specific Policy and Suggestions</u>
Sedona	None.				Wilderness bill directs what can and can't do; Forest Pre-Attack Plan.	Yes. PNF--might also consider igni- tion.
CORONADO					Forest-wide pol- icy, let some fires burn for cost-benefits, but put out all large fires.	Yes. PNF and/or planned ignition.
Douglas	None.					
Safford	PNF.	Yes(5)	Will do a lot of good to open up the coun- try, open wildlife, grazing, recreational use.	None.		
Santa Catalina	PNF. Objectives: to allow fire to have more natural role.	Yes(4)	Fits the wilderness concept, we need the PNF; especially to enhance the bighorn sheep.	Planned ignitions.		
GILA						
Black Range (Gi1a)	PNF.	No(2)	Not extensive enough --only covers 30 per- cent of the wilder- ness; we need planned ignition as well.	Planned ignitions.		
(Leopold)	None.				National or Gila NF policy; use primitive methods only, helicopters as last resort.	Yes. PNF with plan- ned ignition, di- rect action moni- toring and general monitoring.

Table 16, continued

NATIONAL FOREST Ranger District	Area Specific Fire Management Policy	Level of Satisfaction ²	Explanation of Satisfaction Level	Alternatives Considered	General Fire Management Policy	Area Specific Policy and Suggestions
Luna	PNF.	Yes(4)	Need to fine tune some of the prescrip- tions.	None.		
Glenwood	Types of machinery used; PNF, types of actions that we use.	Yes(5)	It does a good job; might review PNF to allow larger ones to burn.	None.		
Reserve	PNF.	Yes(4)	It's good except some areas need relaxed prescriptions (more fire).	(1) Higher ignitions standards for natural fires; (2) planned ignitions.		
Mimbres (Aldo Leopold)	None.		No different in or out of wilderness.	Yes. Allow fire to take more natural role in the wilder- ness, will allow prescribed natural and/or prescribed burns if it goes through Congress.		
(Gila)	Natural ignitions allowed within prescriptions, prescribed burns possible if fuel reduction needs to be done and is allowed.	Yes(5)	Fire is assuming its natural ecological role.	None.		
Silver City	PNF. Methods to attack the fires are limited.	No	Ahead of the game, but still need to have planned ignitions and better (wider) PNF plans.	Planned ignitions.		
Wilderness	PNF on the wilderness.	Yes(4)	It's a good policy; need to keep studying the effects in order to achieve the plan's objectives, but it takes time.	Planned ignitions.		

Table 16, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Area Specific Fire Management Policy</u>	<u>Level of Satisfaction² of Satisfaction Level</u>	<u>Explanation</u>	<u>Alternatives Considered</u>	<u>General Fire Management Policy</u>	<u>Area Specific Policy and Suggestions</u>
KAIBAB						
Williams	Prescribed fire policy-- both natural and planned ignitions.	Yes (5)	We understand it and do what's necessary; we're on top of it.		District-wide policy--put them out if necessary and economically worth while; would probably put out any fire due to large number of fuels in area.	Yes. Would not allow natural fires to burn since it is a small wilderness and rough and steep, any fire would be hard to control and fire damage possibilities are severe.
Chandler	None.					
LINCOLN						
Smokey Bear	None.			National and regional guidelines.	Yes. Initially PNF, next, if possible, planned ignition.	
PREScott					Regional policy.	Yes. Want to adopt a let-burn policy.
Chino Valley	None.					Yes. 1985 fire season management plan (needs approval), prescribed burns, natural burns.
Verde	None.			Same as outside wilderness area, suppress all fires.		
SANTA FE						
Coyote (Chama Rv Canyon)	None.			Forest land management plan, regional and federal guidelines.	Yes. Same sort of prescribed natural and ignited burns.	

Table 16, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Area Specific Fire Management Policy</u>	<u>Level of Satisfaction² of Satisfaction Level</u>	<u>Explanation of Satisfaction Level</u>	<u>Alternatives Considered</u>	<u>General Fire Management Policy</u>	<u>Area Specific Policies and Suggestions</u>
Coyote (San Pedro Park)	PNF.	No(1)	Prescriptions are too restrictive; the re- strictions allow fires only during extreme wet conditions.	Lessen the restrictions; planned ignitions.		
Cuba	PNF.	Yes(4)	Want some planned igni- tions.	Forest-wide pol- icy--put out all fires.	Yes. Let burn until resource damage be- comes too extensive outside and adjac- ent to the wilder- ness.	
Jemez	None.			All fires put out.	Yes. Control all man-made fires; natural burns under prescription.	
Las Vegas	None.			Use forest and regional policy --suppress all fires.	Yes. PNF--should be implemented by 1985 fire season.	
Pecos	None.			Put them all out.	Yes. Would need public involvement and education pro- gram first; would include PNF.	
Tesuque	None.			F.S. manual re- quirements--put them out.	Yes. Would allow certain types of fires to burn de- pending on if the fire fits the new prescription.	
Espanola	None.					
Tonto						
Cave Creek (Mazatzal)	Have two fire management areas--PNF policy.	Yes(4) a1.	Should be more liber- al.	Lessen the prescriptions, make them better.		

Table 16, continued

NATIONAL FOREST Ranger District	Area Specific Fire Management Policy	Level of Explanation of Satisfaction ² of Satisfaction Level	Alternatives Considered	General Fire Management Policy	Area Specific Policy and Suggestions
Cave Creek (Pine Mtn)	None.			Yes. Would adopt a fire management area plan (FMA).	
Globe	None.			Restrictions on mechanized equipment (must have forest supervisor or regional approval).	
Mesa	None.			Aggressively attack all fires.	
Payson	Approved FMA--after more of fuel inventory done, may have more.	Yes(5)	Excellent as is--just need to finish getting to not help fire along rest of the information.	Efficiency, objectives but not direct attack each time if there's a more efficient way; believe in foot/mule attack when practical.	
Pleasant Valley	Prohibit use of motorized equipment except in extreme fire conditions.	No(1)	Want another policy.	No aggressive fire suppression during periods of low fire danger; ideally have PNF as long-term objective.	
Tonto Basin	None.			The standard policy; if it starts, go in and fight.	Yes. PNF, no ignition.

VISITOR MANAGEMENT

Visitor Use Monitoring Methods. Wilderness visitor use was measured by 37 (93%) of the wilderness district rangers (Table 17). Only three of the district rangers with wilderness said they did not measure visitor use, including the Clifton, Pleasant Valley, and Verde ranger districts. The most common means for measuring visitor use, as identified by 24 district rangers, was informal observation by Forest Service personnel when in the field for other reasons. Most district rangers provided at least two responses regarding use monitoring methods, including: volunteer, WIS patrol contacts, and/or trailhead campground hosts ($N = 16$); wilderness ranger patrol ($N = 7$); mandatory wilderness and/or camping permits ($N = 12$); voluntary registration ($N = 7$); electronic trail counters ($N = 5$); user feedback ($N = 3$); and vehicles in trailhead parking lots ($N = 2$).

Nineteen (48%) of the wilderness district rangers reported dissatisfaction with their use monitoring system ($\bar{x} = 2.9$). This was the lowest mean satisfaction score as reported by the district rangers for all monitoring strategies, including monitoring of environmental change. Twelve district rangers felt their monitoring system did not give accurate information, seven rangers said they would like to do more monitoring and six rangers said they would do more if more money were available. Nineteen district rangers said their system was adequate for current use levels.

When the wilderness district rangers were asked what alternative methods they had considered, five rangers said mandatory permits; however, several rangers said they would like to replace the use of mandatory permits with self registration. Eleven rangers considered voluntary registration. Twelve rangers considered wilderness ranger and/or volunteer contacts and nine rangers considered using electronic trail counters.

The seven district rangers who acquired wilderness with the 1984 Arizona legislation were also asked about monitoring visitor use (Table 17). Three of these rangers anticipated using self registration, three anticipated casual observation by volunteers or other Forest Service personnel, and one did not anticipate monitoring visitor use.

When the 24 nonwilderness district rangers were asked if they do or would monitor visitor use, 23 (96%) responded positively.

TABLE 17
Wilderness Visitor Use Monitoring Methods¹

NATIONAL FOREST Ranger District	Use Monitoring Method	Satisfaction With Method ²	Reasons for Satisfaction Level	Alternative Methods Considered
APACHE-SITGREAVES				
Alpine	Voluntary trailhead registration (3 busiest trails); visual observation by volunteers and F.S. personnel.	No(2)	Don't foresee more money to do more monitoring, but our monitoring is adequate for now.	Counters, patrolperson.
Clifton	Did use self registration permits, wasn't adequate, low use numbers; do not monitor now.			
Springerville	Trail counters, volunteer trail counts, University of Arizona volunteer spot checks (visual observation).	Yes(4)	We have a good handle on use levels.	None.
CARSON				
Canjilon	Casual observation by F.S. personnel.	Yes(4)	Have small amount of wilderness, so monitoring we do is adequate.	None.
Penasco	Mandatory permit for overnight use; casual observation and contacts in wilderness by volunteer wilderness patrolman, trail maintenance crews, F.S. personnel.	No(2)	Not getting enough feedback from measurement tools, information isn't summarized or analyzed; don't have enough money to monitor better in wilderness; locals seldom use permits.	Self registration (vs. the current mandatory); wilderness patrol by volunteer or F.S. personnel.
Tres Piedras	Sporadic observation by recreation technician, trail crew, other F.S. personnel.	No(1)	Don't know the types of use, however, have limited use.	Mandatory permit system.
Questa	Wilderness ranger logs and visual observation; wilderness volunteers.	Yes(4)	Impacts and visitor use has established patterns, easy to monitor until (if) amount of use changes.	Mandatory permit, trail registration, volunteers, trail counters.

¹ Includes only those districts with wilderness.

² 1 = not satisfied; 5 = very satisfied

Table 17, continued

NATIONAL FOREST Ranger District	Use Monitoring Method	Satisfaction With Method ²	Reasons for Satisfaction Level	Alternative Methods Considered
CIBOLA				
Magdalena	Observation at trailhead and in the field.	Yes(3)	Adequate with room for improvement.	Electric eye counting devices.
Mountainair	Casual observation when in the field.	No(3)	Given use levels, it's satisfactory.	Volunteer wilderness walkers.
Sandia	Trail counters, visual inspections, verbal reports from RIMs.	No(1)	Like it to be more accurate.	Traffic counts at major trailheads, parking areas, access roads.
COCONINO				
Beaver Creek (New wilderness, 1984)	<u>Anticipate:</u> Self registration, visual counts, and eventually a permit system.			
Elden (New wilderness, 1984)	<u>Anticipate:</u> Self registration.			
Flagstaff	Registration cards at all trailheads; visual observation by F.S. personnel once/yr; observation by trail crews; count at ski lift on Kachina Peaks.	No(1)	Not collecting viable and usable data; don't know if we are using money wisely; don't know use patterns.	Double-sample people by surveying users twice, log data into useable forms.
Long Valley (New wilderness, 1984)	Visual observation when in wilderness for other reasons.	No(2)	No funds to do what we want to do.	Cleanup crews to observe use; wilderness patrolmen.
Sedona	Self registration at one trailhead; visual observation by wilderness patrol when funds are available.	No(1)	Not consistent, don't have handle on amount of use.	WIS, or regular F.S. patrol full-time.
CORONADO				
Douglas	Volunteer permits at trailheads; patrolman; visual observations by other F.S. personnel in the field.	No(3)	Need better monitoring.	Campground hosts at trailheads; full-time wilderness patrolman.

Table 17, continued

NATIONAL FOREST Ranger District	Use Monitoring Method	Satisfaction With Method ²	Reasons for Satisfaction Level	Alternative Methods Considered
PRESCOTT	Registration at one trailhead; trail counter, data pod on road.	Yes(4)	Not fully proven, batteries are low and need maintenance.	if money available, any current method to get better data.
	Anticipate: WIS volunteers complimented by F.S. personnel; self registration at trailhead or permit system.			
	Verde Did use trailhead counters.	Yes(2)	Minimal use area so other measures aren't necessary; wish we had more money to measure use.	None.
SANTA FE	Chama River Canyon: Noncommercial use: voluntary raft permits; commercial use: B.L.M. issues mandatory permits; casual observations by wilderness ranger and volunteers.	Yes(5)	For present use patterns we know what's happening.	More volunteers or F.S. wilderness ranger for campsite monitoring; mandatory permits for noncommercial use.
	San Pedro Parks: Casual observation by wilderness ranger, trail crew, volunteers; during fire restrictions issue mandatory campfire permits.	Yes(5)	The amount of use doesn't require any more measuring.	Quit using mandatory permit for all use; permit for overnight use, trailhead registration.
	WIS volunteer and a wilderness specialist.	Yes(4)	Reason we discontinued permits was because we got same information for 10 years, catches everyone.	Did have mandatory permit system.
Jemez	Do some monitoring of visitor use (no response regarding monitoring method).	Yes(3)	Until we have a wilderness management plan, it's adequate.	Mandatory permits to no permits; full-time wilderness person; trail head registration.

Table 17, continued

NATIONAL FOREST Ranger District	Use Monitoring Method	Satisfaction With Method ²	Reasons for Satisfaction Level	Alternative Methods Considered
Las Vegas	Mandatory permit system; trail counters--done previously, observations by F.S. personnel.	No(2)	Tools don't allow us to monitor the entire use of the wilderness.	Monitor high use areas; have volunteers or F.S. FTEs in the field all the time.
Pecos	Mandatory permits for overnight use, F.S. personnel observation.	Yes(4)	Because the permit system gets the majority of the use.	WIS program, volunteer trail-head campground host.
Tesuque	Mandatory overnight camping permits; WIS volunteers monitor cars, trailheads, trails.	Yes(2)	Would feel better with statistically sound numbers; need money and personnel for better visual observation; visual is better than counters.	None.
Espanola	Mandatory overnight camping permits; use recreation visitor days for trends; visual observation when on patrol.	Yes(3)	Best we've got at this time, we don't get enough use to get overuse.	Counters; hesitant to use voluntary trail registration due to vandalism.
Tonto	Visual observation by F.S. personnel; reports by miners, grazing permittees and recreation users.	Yes(4)	Mazatzal: Use levels are low, so more sophisticated measures may not be cost effective. Pine Mtn: Uneasy feeling not knowing use in there, we think it is low.	Electronic eye counters, trail registration.
Cave Creek	Observations by paid personnel when in the wilderness.	Yes(5)	With low use at present there are no problems.	None yet.
Globe	Self registration; surveys by WIS at trailhead (hit or miss).	No(3)	Needs higher percent accuracy.	Volunteers at all major trail-heads; self registration--poor success.
Mesa	Informal observations: cars at trail-head, correspondence asking for information, campsite impact.	No(2)	Need registration or permit system.	Trail head registration; permit system.
Payson	Do not currently monitor use.			WIS or wilderness ranger during high use.
Pleasant Valley	Informal observations.	Yes(4)	It's adequate now due to limited use.	As use increases, will use WIS program.
Tonto Basin				

Wilderness Carrying Capacity

Commercial Recreation. Three of the forty wilderness district rangers had determined the carrying capacity of their area for commercial recreation use, including Questa, Verde, and Pecos Ranger Districts (Table 18). Methods used for determining commercial carrying capacity included intuition, studying use patterns, trends and predictions, permit system information, and campsites and trails available. The three district rangers were all satisfied with the methods used to determine the commercial carrying capacity; although the Pecos district ranger said the numbers were suspect to accuracy.

Noncommercial Recreation. Seven of the wilderness district rangers had determined the carrying capacity of their area for noncommercial recreation use. Methods used for determining noncommercial carrying capacity included intuition, counters and previous use numbers, campsite conditions, and the wilderness opportunity spectrum. Two district rangers said their carrying capacity had been determined for the old forest plan.

Important Elements of Carrying Capacity. The district rangers, both wilderness and nonwilderness, that did not have an established carrying capacity were asked to identify their perceptions of the most important elements in determining carrying capacity. Responses of both wilderness and nonwilderness district rangers were very similar regarding commercial and noncommercial use. The most common carrying capacity determinant identified ($N = 38$) was the physical impacts on the wilderness. User characteristics and use patterns ($N = 29$) and a study of trails ($N = 20$) and campsites ($N = 23$) were also considered important. User preferences and attractions ($N = 17$) and the social carrying capacity ($N = 13$) were also popular determinants. Conflicts between commercial and noncommercial users were identified as important carrying capacity criterion by 15 district rangers. Wildlife was identified by 11 district rangers in reference to commercial carrying capacity and by seven rangers regarding noncommercial carrying capacity. The competition for forage and water between wildlife and pack stock was also identified in relation to wildlife in general. Additional factors identified as important for determining carrying capacity included availability of water (deemed as more important by nonwilderness than by wilderness district rangers), trailhead accessibility, and the relative proximity of campsites and corrals.

TABLE 18
Methods Used to Determine Wilderness Carrying Capacity*

NATIONAL FOREST Ranger District	M E T H O D			Satisfaction Yes/No	Limitations of the Procedure Used
	Commercial	Noncommercial			
APACHE-SITGREAVES					
Springerville	No.			Yes. (Done in old plan.)	
CARSON					
Questa (Wheeler Peak)	Yes. (Permit system, campsites, trails, use patterns.)	Yes, (Permit system, campsites, trails, use patterns.)	Yes.		
CIBOLA					
Magdalena	No.		Yes. (Done in Forest Plan.)		Can't judge; levels predicted were high for present time.
Sandia			Yes, (Wilderness opportunity spectrum--similar to recreational opportunity spectrum.)		Yes; it was a good, accurate measure.
CORONADO					
Safford	No.		Yes. (Study area, suggested number of users for available recreation sites without over-crowding.)		Yes; good for now, wouldn't do well if higher use developed.
PREScott					
Verde	Yes. (Intuition.)		Yes. (Intuition, counters, previous use numbers, status of site conditions.)	Yes.	
SANTA FE					
Pecos			Yes. (Carrying capacity for total use; differing numbers and types of users at different vegetation types, then averaged for entire wilderness.)	Yes, it's a good management tool.	The numbers are suspect to accuracy.

*Only those areas with an established carrying capacity included; with wilderness prior to 1984 Arizona legislation.

Role of Researchers and Managers in Determining Carrying Capacity

All 64 district rangers were asked their opinion regarding the respective roles of researchers and managers in determining wilderness carrying capacity. Wilderness and nonwilderness district rangers responded very much alike; therefore the findings represent the group as a whole. Nineteen (30%) district rangers responded that researchers and managers should work cooperatively to determine the carrying capacity, and then managers manage the wilderness accordingly. Seventeen district rangers (27%) suggested that researchers alone should determine the carrying capacity. Eleven district rangers (17%) felt that researchers should determine the carrying capacity in general and the managers should establish it in detail for the individual wilderness. Seven district rangers suggested that managers should define problem areas and then researchers should evaluate the problems and determine the carrying capacity based on those problems. It was generally agreed that researchers should develop appropriate sampling techniques for measuring the variables used in determining carrying capacity.

Wilderness Use Limitation Systems

Wilderness district rangers were asked if they presently limited visitor use in their wilderness and six rangers (15%) responded positively (Table 19). Two rangers reported a party-size limit (15 and 25) and one ranger reported a length of stay limit of 14 days. Three rangers reported different use ceilings for different spatial zones within their wilderness, and two rangers had different use ceilings for different times (such as day use only). Four of the six district rangers with use ceilings were satisfied with their ceilings.

None of the wilderness district rangers assigned visitors to campsites. Fourteen (35%) of the wilderness district rangers attempted to limit or alter use of their area by changing access routes. Two wilderness district rangers anticipated setting an overall use ceiling for their area in the near future.

When the 24 nonwilderness district rangers were asked if they would limit visitor use in wilderness, 15 (79%) responded positively. Six (29%) nonwilderness district rangers reported they would assign visitors to campsites. Fifteen (75%) nonwilderness district rangers responded positively to limiting or altering use by changing access routes to the area.

The 64 district rangers were asked how they would decide upon an appropriate use ceiling. The most common response ($N = 27$) was to examine the physical impacts on the wilderness. Use patterns, the physical and social carrying capacity of the area, and user feedback were also common suggestions for identifying use ceilings. A "first

"come-first served" approach was suggested by 75 percent of the district rangers when asked how they would decide who gets to use the wilderness. Twelve rangers suggested a lottery. Five rangers suggested that historical users should have first priority and five rangers suggested that noncommercial users should have first priority.

TABLE 19
Wilderness Use Limitation Systems¹

NATIONAL FOREST Ranger District	Limit Visitor Use	Spatial Use	Z O N I N G Temporal Use	How Use Ceiling Selected	Level of Satisfaction ²	Allocation Technique (Tried/Suggested)	Assign Visitors to Campsites	Limit/Alter Use by Changing Access Routes
APACHE-SITGREAVES								
Clifton	None.					Would use first come-first serve.	No	Yes
CARSON NF								
Penasco	Yes (party size limit of 15).			Unknown.	Yes (2); might have too many people in one area if five parties from the five districts of the wilderness got together at the same time.	Parties of 15 or less.	No	Yes
Questa						Registration/permit allocation.	No	Yes
CIBOLA							No	Yes
Magdalena	None.							
COCONINO								
Sedona	Yes (day use only, three miles into Packard trail).	Yes		No	Only in terms of location--lower three miles in Packard trail-head is day use only.	Yes (2); not able to enforce it due to limited personnel.	No limit now on numbers, would use first come-first serve, would favor individuals over large groups or profiteers.	No

¹Only those areas with overall use altering and/or limitation systems included; with wilderness prior to 1984 Arizona legislation.

² 1 = not satisfied; 5 = very satisfied

Table 19, continued

NATIONAL FOREST Ranger District	Limit Visitor Use	Spatial Use	Z 0 N I N G Temporal Use	How Use Ceiling Selected	Level of Satisfaction ²	Allocation Technique (Tried/Suggested)	Visitors to Campsites	Limit/Alter Use by Changing Access Routes
CORONADO						First come-first serve.	No	Yes
Safford	None.					Control overnight and long-term use; won't alter day use; mostly control designated access points; combination of first come-first serve and lottery.	No	Yes
Santa Catalina	None.					Random numbers; first come-first serve.	No	
GILA						Wouldn't exclude commercial in favor of noncommercial use.	No	
Luna	None.					Reservation system; first come-first serve.	No	Yes
Glenwood	None.					Zone the sites, probably first come-first serve.	No	
Mimbres	None.					Determine when management plan was written, tied it to the number of horse and people impacts from a group of that size on certain areas.	No	Yes
Silver City	Yes (group size maximum of 25).	No						

Table 19, continued

NATIONAL FOREST Ranger District	Limit Visitor Use	Spatial Use	Z O N I N G Temporal Use	How Use Ceiling Selected	Level of Satisfaction ²	Allocation Technique (Tried/Suggested)	Assign Visitors to Campsites	Limit/Alter Use by Changing Access Routes
Wilderness								
KAIBAB	None.					Noncommercial and historical use would have higher priority; by first come-first serve.	No	Yes
PRESCOTT Verde	None.					First come-first serve.	No	Yes
SANTA FE Cuba	Yes (day use only at one lake area).	Yes		Yes	95 percent of the fishermen go to the lake, so we closed it because of predicted impact.	Permit registration system, patrol the area for compliance; lottery most likely; first come-first serve doesn't work well with lots of demand.	No	Yes
Pecos	Yes (Lake basin areas, other riparian areas--day use only).	Yes		Yes	Lake basin areas, other riparian areas, restrict area for overnight camping; site degradation was warning (soil, fire rings, other impacts); used permit system to see user's numbers at these areas.	No (2); they are the most popular areas; we still want people to use the areas so are looking at alternatives.	No	No

<u>NATIONAL FOREST Ranger District</u>	<u>Limit Visitor Use</u>	<u>Spatial Use</u>	<u>Z O N I N G Temporal Use</u>	<u>How Use Ceiling Selected</u>	<u>Level of Satisfaction²</u>	<u>Allocation Technique (Tried/Suggested)</u>	<u>Visitors to Campsites</u>	<u>Limit/Alter Use by Changing Access Routes</u>
Tonto								
Cave Creek (Pine Mtn)	None.	No	No	First come-first serve.	No	Yes		
Payson	Yes (14-day limit).	No	No	14 days maximum; must exit, then can come back.	Yes (5); adequate for current needs.	Design by need or pattern of use to be compatible with wilderness philosophy.	No	No
Tonto Basin	None.	No	No		Change depending on fairness level, (e.g., start by monitoring with WIS and then as necessary use reservations); give everyone an equal chance.	No	Yes	

Information/Education Programs

Thirty-nine (98%) of the wilderness district rangers used information or education programs to encourage visitors to reduce their impacts on the wilderness (Table 20). Most district rangers were satisfied with their education program ($\bar{x} = 3.5$), although eight said they would do more if they had more funding.

Sixteen of the wilderness district rangers explained that their education program had room for growth and improvement. Nine district rangers said their education program was adequate based on current use levels. The Sedona district ranger said he did not have an education program at the time of this study and did not anticipate implementing one. However, maps and brochures were available in their district office, as with the other districts.

The wilderness district rangers were asked to describe the content and location of their visitor education program. The majority of the education programs focused on no-trace camping and wilderness ethics in general. Several district rangers mentioned promotion of the wilderness to local people as a focus of their education program. Several district rangers offered fire prevention information.

Wilderness users were the primary focus of the programs, educated in the wilderness by 22 districts and at the trailhead by 14 districts. Eighteen rangers reported education programs for school groups in their classroom. Seventeen rangers reported programs for recreational groups at the group's meeting place. Two rangers said they educated the public at natural resource and/or environmental appreciation community events. The most common location for visitor education was the district office responding to visitor requests, as identified by 32 wilderness district rangers.

Wilderness district rangers also were asked to explain how they communicated the educational information. Thirty-six of these rangers said that Forest Service personnel or volunteers provided oral presentations, some of which included one-to-one conversational information in the district office, at the trailhead, and in the wilderness (Table 20). Thirty-four rangers reported use of brochures for educational purposes. Fifteen rangers reported use of slide-tape presentations, nine used movies, and one used a video tape. Five rangers said they had a WIS (Wilderness Information Specialist) program and five additional rangers mentioned use of volunteers. Four rangers used skits to convey their message, especially the "Impact Monster." Eight rangers referred to displays and exhibits. The Santa Catalina, Sandia, Gila, and Mesa Ranger Districts used the Wilderness Skills Trail. Several rangers mentioned use of signs, maps, and the *Recreation Opportunity Guide* as forms of education. The Penasco District provided environmental education workshops. The Gila Wilderness district ranger reported contacting users at their home through the permit system.

TABLE 20
Information/Education Programs to Reduce Wilderness Impacts¹

NATIONAL FOREST Ranger District (Wilderness Area)	Type of Program	How Message Conveyed	Who Receives Program	Where/When Program Administered	Satisfaction With Program ²	Reasons for Satisfaction Level		Other Information/ Education Programs Considered
						Printed package on trail status; lobby exhibits.	With use level and budget limits, it is adequate.	
APACHE-SITGREAVES								
Alpine (Blue Range Primitive Area) New 1984: Bear Wallow and Escu- dilla	No-trace camping; pack in and pack out; conservation awareness.	Posters; talks with volunteer groups; hand- outs; slides; movies.	Potential users; school groups; recreation groups.	In District Office (D.O.); in group meetings; in schools.	Yes (4)	With use level and budget limits, it is adequate.	Printed package on trail status; lobby exhibits.	
Clifton (Blue Range Primitive Area)	Promote volunteer programs.	Newspaper ar- ticles to pro- mote programs; talks; slides; movies.	General public; school groups; recreation groups.	In schools.	Yes (4)	Could always do better.	Recreation guides for Apache Sit- greaves N.F.	
Springerville (Mt. Baldy)	Promote volunteer programs.	Talks; bro- chures by D.O.; volunteers in the field.	Wilderness users and potential users.	In the wilderness and D.O.	No (2)	Don't have the money to do it right.	General info to public to reduce impacts, at camp- grounds and other high recreation areas.	
CARSON								
Canjilon (Chama River Canyon)	General info and wilderness ethics.	Brochures; talking one- to-one.	Potential wil- derness users.	D.O. only.	Yes (4)	Very limited use; few, if any problems.	Traillhead informa- tion system.	

¹ Includes only those areas with wilderness prior to the 1984 Arizona wilderness legislation.

² 1 = not satisfied; 5 = very satisfied

Table 20, continued

NATIONAL FOREST Ranger District (Wilderness Area)	Type of Program	How Message Conveyed	Who Receives Program	Where/When Program Administered	Satisfaction With Program ²	Reasons for Satisfaction Level	Other Information/ Education Programs Considered
Penasco (Pecos)	Environmental ed. workshops; low impact camping.	Mostly talks; also brochures; movies, and use Game and Fish people as resources for the talks.	Summer camps; recreation groups; camp- ers.	Campground outside of wilderness; recreation group meeting areas; at camps.	No (2)	Ability to do visitor education is low, most is volunteer or F.S. person.	Have full-time per- son to do visitor education; either volunteer or F.S. person.
Tres Piedras (Cruces Basin)	Wilderness eth- ics.	Talks; slide shows; bro- chures; signs.	Schools; rec- reation groups; wilderness users.	Signs at trail- heads; brochures at D.O.; schools; recreation groups.	Yes (4)	As use in- creases, we will need to be more inform- ative, speci- fically for Cruces Basin.	None.
Questa (Wheeler Peak and Latir Peak)	Wilderness ethics; pack in-pack out; no-trace camping.	Talks; movies; brochures; slides; trail- head signs;	D.O. visitors; wilderness users; school groups; user groups; Chamber of Com- merce; maps; recreation op- portunity guide in D.O.	D.O.; wilderness; group meeting places; trail- heads; schools.	Yes (4)	Problem: we don't get re- turning wil- derness users; most are one- time users so it's hard to contact all possible users.	Full-time informa- tion specialist; increase education programs; more con- tact with Chamber of Commerce; dis- tribute more rec- reation opportuni- ty guides; improve map information and distribution.
CIBOLA	Personal contact (unplanned) in the wilderness; respond to re- quests for talks.	Talks; bro- chures; one- to-one conver- sations.	Wilderness users; D.O. visitors; school groups.	In the wilderness (unplanned); schools; D.O.	Yes (4)	Could reach more people but it's not a high prior- ity.	Signing at trail- heads.
Magdalena (Apache Kid and Witwing- ton)							

Table 20, continued

NATIONAL FOREST Ranger District (Wilderness Area)	Type of Program	How Message Conveyed	Who Receives Program	Where/When Program Administered	Satisfaction With Program ²	Reasons for Satisfaction Level		Other Information/ Education Programs Considered
						Level	Reasons for Satisfaction Level	
Mountainair (Manzano)	Wilderness ethics; pack in-pack out; no-trace camping.	Brochures; one-to-one conversations.	D.O. visitors.	In D.O. when people request information.	Yes(3)	Use is light so our current program is reliable.	None.	
Sandia (Sandia Mtn)	Wilderness ethics; no-trace camping.	WIS program-- all volunteers; adopt a trail; impact monster; wilderness skills trails; brochures; maps; D.O. office display cases; N.F. field days.	Wilderness users; D.O. visitors; school groups; recreation groups; general public.	In the wilderness; trailheads; D.O. office; schools; universities; group meeting places; environmental appreciation events.	Yes(4)	Can always do better; more public contact; public contact officer for WIS training in the field.	More of what is being done now.	
COCONINO								
Flagstaff (Sycamore Canyon) New 1984: Red Rock-Secret Mtn.	Brochure on wilderness ethics.	Brochure.	D.O. visitors.	In the D.O.	Yes(4)	No visitor impacts.	None.	
(Kachina Peaks, new 1984)	Wilderness ethics; stay on established trails.	Talks; signing; brochures.	Wilderness users; ski lift users; civic groups; school groups.	Trailheads; ski lift; at civic groups; in D.O.	No(2)	In light of problems, we need to do more.	Better handouts on the Peak's fragility; contact user groups and ski area users.	
Sedona (Sycamore Canyon)	None.				Yes	No real problems at this time; good quality of user and only one high impact area where limit it to day use.		

Table 20, continued

<u>NATIONAL FOREST Ranger District (Wilderness Area)</u>	<u>Type of Program</u>	<u>How Message Conveyed</u>	<u>Who Receives Program</u>	<u>Where/When Program Administered</u>	<u>Satisfaction With Program²</u>	<u>Reasons for Satisfaction Level</u>	<u>Other Information/ Education Programs Considered</u>
CORONADO							
Douglas (Chiricahua)	General information.	Contact in D.O.; wilderness patrol-person.	Wilderness users; D.O. visitors.	In D.O.; in the wilderness; trailheads.	No (3)	Could do more but use levels are not high.	Trailhead hosts at campgrounds; slide tapes for school groups.
Safford (GatTuero) New 1984; Santa Theresa	Wilderness ethics.	Slides; movies; D.O. visitors; schools; service clubs.	When users contact the D.O.; go to schools; group meeting places.	Yes (3)	Don't beat the bushes; could do better.	Slides and tapes; video tapes to loan out and view in D.O.	
Santa Catalina (Pusch Ridge)	Wilderness ethics.	Talks; personal contact in wilderness by volunteers; wilderness skills trainings; brochures; displays in D.O.	Wilderness users; recreation groups with a request; in school groups; recreation groups; general public.	No (3)	We are doing some; but kind of hit-and-miss.	Pocket brochure for general distribution; map/brochure to include information on wilderness and nonwilderness.	
Black Range (Gila)	Wilderness ethics; low impact camping.	Personal contact by receptionist in office; brochures; visuals.	Wilderness users; D.O. only.	Yes (3)	Sufficient for current level of management.	Wilderness patrol-man; contact visitors in field.	
(Aldo Leopold)	None.				Would implement a program if money were available.	Direct contact with interested public.	
Luna (Blue Range)	Wilderness ethics.	Brochures; maps; office displays; personal contacts in the field.	Wilderness users; D.O. visitors; campground users.	Yes (4)	Could be more intensive.	None.	

Table 20, continued

NATIONAL FOREST Ranger District (Wilderness Area)	Type of Program	How Message Conveyed	Who Receives Program	Where/When Program Administered	Satisfaction With Program ²	Reasons for Satisfaction Level	Other Information/ Education Programs Considered
Glenwood (Gila)	Wilderness eth- ics.	Talks; slide shows; bro- chures; wil- derness tech- nician and trail foreman; contact people in the field.	Wilderness users; D.O.; school groups.	In the wilderness; D.O.; schools.	Yes(4)	Would like to improve what we do; need to avoid over ed- ucation of public, forcing it on people.	More schools; bet- ter slides and photos for D.O.; need aides at self- registration boxes.
Mimbres (Atto Leopold and Gila)	Low impact camp- ing.	Brochures; slide-tape presentations; posters; talks; personal con- tact in field; D.O. office.	Wilderness users; D.O.; recreation groups.	In the wilderness; group's meeting place.	Yes(5)	Appropriate for amount of use.	Video presentation, but costs are high per number of view- ers.
Reserve (Gila)	Wilderness eth- ics; pack in- pack out; no- trace camping.	Talks; signs; slide-tape shows; bro- chures.	Schools; general public; wil- derness users and potential users; civic groups.	In the wilderness; civic groups and school locations; D.O.	Yes(4)	Most of the visitor educa- tion is done by the wilder- ness district; our limited amount of acre- age is used lo- cally and they know what is proper.	None.
(Blue Range)	Pack in-pack out; no-trace camping.	Brochures.	D.O. visitors.	When users con- tact the D.O.	Yes(4)	Don't get any use on our section.	None.
Silver City (Gila)	Wilderness eth- ics.	Personal con- tact in field and D.O.; talks; films; displays in D.O.; bro- chures.	Wilderness users; Personal contact in field and D.O.; when visitors get use permits; schools; civic groups.	No(3)	Don't think it is enough.	WIS program; slide show; video tape in office.	

Table 20, continued

NATIONAL FOREST Ranger District (Wilderness Area)	Type of Program	How Message Conveyed	Who Receives Program	Where/When Program Administered	Satisfaction With Program ²	Reasons for Satisfaction Level	Other Information/ Education Programs Considered
Wilderness (Gila)	No-trace camping; wilderness ethics.	WIS personal contacts; wilderness skills trail; contact user at home through permit system; National Park visitor center; brochures; demonstrations.	Wilderness users; potential users; outfitter guides.	In the wilderness; at trailheads; urban areas for skill trials and mailouts; D.O.	Yes(4)	Just started the education program; all areas could be improved; it's a good beginning.	Video tapes in D.O. of no-trace camping.
KAIBAB							
Williams (Sycamore Canyon)	Wilderness ethics; low impact camping; pack in-pack out.	Brochures and one-to-one conversations.	Potential wilderness users.	When users contact the D.O.	No(2)	Should have more active program to lessen impacts and educate users.	None.
Chalender (Sycamore Canyon) New 1984; Kendrick Mtn	Wilderness ethics; no-trace camping.	Brochures; maps; one-to-one conversation in D.O.	Potential users.	D.O. only.	Yes(3)	Don't get much use; when Kendrick becomes wilderness, will do more.	Trailhead signs; permit system; news media.
LINCOLN							
Smoky Bear (Capitan Mtn and White Mtn)	Wilderness ethics.	WIS program; skills trail; personal contact; slide message; movie; recreation opportunity guide; brochures; talks; demonstrations.	Wilderness users; potential users; visitors; D.O.; school groups; recreation opportunity groups (especially horse groups).	In wilderness; request basis; D.O.; schools; group meeting places.	Yes(3)	Seem to reach current users; although still have problems, e.g., firings; either need to reach more or people aren't listening.	Impact monster skits in schools on more regular basis.

Table 20, continued

NATIONAL FOREST Ranger District (Wilderness Area)	Type of Program	How Message Conveyed	Who Receives Program	Where/When Program Administered	Satisfaction With Program ²	Reasons for Satisfaction Level	Other Information/ Education Programs Considered
PREScott							
Chino Valley (Sycamore Can- yon) New 1984; Apache Creek and Woodchute	General informa- tion; suggest alternative recreation areas.	Brochures; one-to-one conversations.	Users; D.O. visitors.	D.O. only.	Yes(3)	Could do more with better use of information and more funds.	None.
Verde (Pine Mtn) New 1984; Cedar Bench and Woodchute	General informa- tion.	Brochures; signing; used to have wilder- ness ranger.	Users; D.O. visitors.	In the wilderness; trailheads; D.O.	Yes(4)	It's doing the job now with the current levels of use.	None.
SANTA FE							
Coyote (San Pedro Parks)	Wilderness eth- ics; general information.	Brochures; wilderness map; one-to-one con- versation.	Users; D.O. visitors.	D.O. only.	Yes(4)	Use isn't very high so there isn't a high emphasis.	As demand in- creases, will in- crease education program.
(Chama River Canyon)	No-trace ethics.	Brochures; talk to com- mercial guides; one-to-one con- versation.	Rafters; other users; D.O.	D.O.; at per- mittee's loca- tion.	Yes(4)	Doing an ade- quate job, little impacts seen, possibly even improved.	Let B.L.M. manage entire river; have store owner at Riv- er who grants per- mits handle educa- tion; volunteers to conduct programs; paid employees to conduct programs; host at camp- grounds.
Cuba (San Pedro Parks)	General informa- tion; wilderness ethics.	WIS in the wilderness; brochures; map; one-to- one conversa- tion.	Users in wil- derness area; visitors to D.O.	In wilderness.	Yes(4)	Don't want to encourage more wilderness use so we supply information to interested users.	None.

Table 20, continued

NATIONAL FOREST Ranger District (Wilderness Area)	Type of Program	How Message Conveyed	Who Receives Program	Where/When Program Administered	Satisfaction With Program ²	Reasons for Satisfaction Level	Other Information/ Education Programs Considered
Jemez (Dome)	General information; wilderness ethics.	One-to-one conversation; brochures.	D.O. visitors.	D.O. only.	Yes (3)	Trying to keep it low key; with low visitor use and lack of wilderness management plan; with plan we will be prepared for more users.	Personal contact; brochures; ranger contacts, slide-tape shows at schools; recreation groups.
Las Vegas (Pecos)	Wilderness ethics.	Personal contacts in the wilderness; brochures in D.O.; one-to-one conversation in the D.O.	Wilderness users; D.O. visitors.	In the wilderness; D.O.	No (2)	Only contacting a few of the actual number of users.	None.
Pecos (Pecos)	Wilderness ethics.	Four seasonal wilderness patrol persons--personal contacts in wilderness and at trailhead; brochures; talks; D.O. one-to-one conversation.	Users; local people; recreation groups.	D.O.; in the wilderness; trailhead; group and school locations.	No (2)	We could do more; need more personnel for more visitor contacts.	Slide-tape show in D.O.; trailhead campground interpretive programs.
Tesuque (Pecos)	General information; promote volunteer programs.	Talks; brochures; sign-ing.	Recreation Clubs; Group meeting place; trailhead signs; D.O.	Yes (3)	If do more; need more money.	No-trace camping program.	

Table 20, continued

NATIONAL FOREST Ranger District (Wilderness Area)	Type of Program	How Message Conveyed	Who Receives Program	Where/When Program Administered	Satisfaction With Program ²	Reasons for Satisfaction Level	Other Information/ Education Programs Considered
Espanola (Pecos)	Wilderness eth- ics; fire pre- vention.	Audio visual; slide tape show; movies; talks.	Wilderness users; D.O. visitors; school groups; local groups.	Schools; group's meeting place.	Yes (4)	Gaps in non- local contact; lack of con- tact with peo- ple who don't register; also have old-time campers and permittees who won't change their ways.	
Tonto							
Cave Creek (Nazatza)	Wilderness eth- ics; promote wilderness use by local people.	In the field; signing at trailheads; D.O. visits; talks; slides; brochures; maps.	Wilderness users; potential users; D.O.; trailheads. school groups; trail rider groups.		Yes (4)	Adequate for current use.	With more use, will have to do more.
(Pine Mtn)	Wilderness eth- ics; promote wilderness use by local people.	Direct ques- tions to Camp Verde R.D. in Prescott N.F.			Yes (5)	Low-use levels.	With more use, will have to do more.
Globe (Superstition; New 1984; Salt River Canyon)	General wilder- ness ethics.	Brochures; talks.	Wilderness users; potential users; D.O. visitors.	D.O.; schools; club meetings; in the field (few).	Yes (5)	Number of peo- ple from local area is small, and overall use is low.	None--keep it low key to keep low use.
Mesa (Superstition) New 1984; Four Peaks	Wilderness eth- ics; no-trace ethics.	WIS program; WIS volunteers; skills trail; talks; impact master; slide- tapes; bro- chures; D.O.	Users; potential users; school groups; groups that need it as observed by the WIS volunteers.	In the wilderness; trailhead; schools; signing; recreation groups; horse groups; scouting groups; senior citizen groups.	Yes (4)	Could do more; but it's going good--will have future impact.	Education and no- trace camp for Boy Scouts; no-trace camping education mandatory for Boy Scouts; news media; documentary TV; more WIS; more in- town education.

Table 20, continued

NATIONAL FOREST Ranger District (Wilderness Area)	Type of Program	How Message Conveyed	Who Receives Program	Where/When Program Administered	Satisfaction With Program ²	Reasons for Satisfaction Level	Other Information/ Education Programs Considered
<u>Payson</u> (Mazatzal) New 1984: Heissgate	Wilderness eth- ics.	Talks; posters; Wilderness users; D.O.; group meet- ing place. D.O. visitors.		Yes(4)	OK, for "where we're at."	Would like to have WIS at selected trailheads.	
<u>Pleasant Valley</u> (Sierra Anchas) New 1984: Salome and Heissgate	Wilderness eth- ics; general information.	Personal con- tact.	Mostly organized groups (their heaviest use); school groups.	Group meeting place;	Yes(3)	Not contacting small user groups unless limited trail crew runs across them; are contact- ing organized groups.	None.
<u>Tonto Basin</u> (Superstitions and Mazatzals) New 1984: Four Peaks, Salome, and Salt River Canyon	General informa- tion.	Brochures; maps.	D.O. visitors.	D.O. only.	No response	Most educa- tion for these areas is done by other dis- tricts.	Not applicable.

The wilderness district rangers were asked to identify additional education programs they had considered. One-third of the rangers ($N = 13$) had not considered any additional education techniques. Ten said they would like to do more of what was being done. Seven rangers wanted more WIS and volunteer contacts and three wanted a wilderness ranger. Five rangers wanted slide-tape presentations; four wanted video tape presentations, and several rangers wanted more displays and signs as educational tools.

The 24 nonwilderness district rangers were asked if they would have an educational program if they had wilderness on their districts. The response, unanimously positive, included all of the new (1984) wilderness district rangers who anticipated development of an education program (Table 21). The Sierra Vista, Bradshaw, and Elden district rangers anticipated the WIS program. The Beaver Creek district ranger would like to use volunteers if money becomes available. These four districts envisioned in-town as well as trailhead and wilderness contacts.

TABLE 21
INFORMATION AND EDUCATION PROGRAMS ANTICIPATED BY NEW (1984) WILDERNESS DISTRICTS

NATIONAL FOREST Ranger District (Wilderness Area)	Anticipated Program	Type of Program	How Message Conveyed	Who Receives Program	Where/When Program Administered
CORONADO					
<u>Nogales</u> (New 1984: Mt. Wrightson, Pajarita)	Yes	Wilderness ethics.	Visitor contacts; slide show; talks.	School groups; recreational groups; campground users.	Schools; group meeting place; campgrounds at wilderness trailheads.
<u>Sierra Vista</u> (New 1984: Miller Peak)	Yes	Low impact camping; dispersement of pub- lic; pack-in, pack- out.	WIS program; formal and informal talks; skits.	Wilderness users; potential users; D.O. visitors; school groups; recreation groups.	In the wilderness; D.O.; schools; group meeting place; environmental appreciation events.
PREScott					
<u>Bradshaw</u> (New 1984: Granite Mtn., Castle Creek)	Yes	No-trace camping; wi- lderness appreciation.	WIS program; need full- time personnel; brochures; town youth camps.	Wilderness users; school groups; recreation groups; groups that use the wil- derness and can be identi- fied; retirement groups; Chamber of Commerce.	Primarily in wil- derness; some in town; group meeting place; schools.
COCONINO					
<u>Beaver Creek</u> (New 1984: Fossil Springs, West Clear Creek, Wet Beaver)	Yes	General information.	Brochures; talks; program would depend on money avail- able; would use volunteers if possible; trailhead signing.	General public.	Trailhead; D.O.
<u>Elden</u> (New 1984: Kachina Peaks, Strawberry Crater)	Yes	Wilderness ethics.	WIS program; talks; wil- derness skills trail; incorpo- rate wilderness ethics into school curriculum.	Wilderness users; schools.	Trailhead; in town; co- ordinate school program within district.

Table 21, continued

<u>NATIONAL FOREST Ranger District (Wilderness Area)</u>	<u>Anticipated Program</u>	<u>Type of Program</u>	<u>How Message Conveyed</u>	<u>Who Receives Program</u>	<u>Where/When Program Administered</u>
<u>Long Valley</u> <u>(New 1984: West Clear Creek, Fossil Springs)</u>	Yes	Orientation to the wilderness area.	Personal contact in the D.O. (would like to develop brochure of the areas and have registration and campsite control).	Potential wilderness users.	D.O.
<u>KAIBAB</u>					
<u>North Kaibab</u> <u>(New 1984: Kanab Creek, Saddle Mtn)</u>	Yes	Wilderness is infant stages now; will have to have direction and emphasis on visitor education to increase potential.	Brochures; map; one-to-one conversation.	D.O.; visitors; potential users.	In D.O. when people request information.

WILDERNESS MANAGEMENT PROBLEMS

District rangers were asked to identify and rank order their three most serious problems encountered in managing wilderness (Table 22). Among the 40 wilderness district rangers, lack of funding was the most common response ($N = 20$, 50%). Twelve wilderness district rangers identified it as their most serious problem, four said it was their second most serious problem, and four said it was their third most serious problem. A similar concern for inadequate FTEs (full-time equivalents) was identified by six wilderness district rangers as their second most serious problem and by two wilderness district rangers as their third most serious problem.

Apart from funding and inadequate number of FTEs, the responses were somewhat varied. Overcrowding or overuse was a common response ($N = 9$), identified by six wilderness district rangers as the most serious problem, two rangers as second most serious, and one ranger as third most serious. Vehicular intrusion was also a common problem ($N = 9$): the most serious for three rangers, second most serious for one ranger, and third most serious for five rangers. Conflicts with grazing was the most serious problem for four rangers and the third most serious for two rangers.

Problems with access and/or right-of-ways were identified by five wilderness district rangers. Lack of wilderness boundary markers was a problem for four district rangers. Vandalism and/or theft was identified as a problem by four rangers. Dissatisfaction with fire management was identified as a serious problem by three district rangers. Several district rangers expressed the need for accurate carrying capacities as a major problem. Several also mentioned inadequate monitoring as a problem, related both to insufficient amount of monitoring and need for information on how and what to monitor.

When the 24 nonwilderness district rangers were asked their perceptions of serious wilderness management problems, responses were similar to those of the rangers with wilderness. Overcrowding and overuse was the most common response ($N = 10$), followed by lack of funding or FTEs ($N = 9$), vehicular intrusion ($N = 5$), and conflicts with grazing ($N = 4$). It is interesting to note that overcrowding and/or overuse was perceived to be a greater problem by nonwilderness district rangers than it was for wilderness district rangers, whereas lack of funding was perceived as a serious problem to half of the wilderness district rangers.

TABLE 22

Three Most Serious Wilderness Management Problems:
Perceptions of the District Ranger*

NATIONAL FOREST**Ranger District Management Problems (in order of seriousness)****APACHE-SITGREAVES**

Alpine	1. Grazing permittees vs. wilderness laws and philosophy. 2. Inconsistent and/or lack of funding. 3. What is going to happen to the Blue Range? (wilderness or primitive?)
Clifton	1. Past overgrazing. 2. Motor vehicle intrusion. 3. Lack of primitive area classification by users and grazing permittees.
Chevelon	1. Knowing the direction to go (personal, F.S. wide, and with users). 2. Getting the direction accomplished (need the tools). 3. Having the resource for wilderness, some areas don't have the opportunity for wilderness values.
Heber	1. Motorized encroachment. 2. Illegal drug cultivation. 3. Good mining operating plans that provide agreement between F.S. and operator.
Springerville	1. Overcrowding in certain areas. 2. Trail maintenance and lack of money to fix them. 3. Lack of money to do an adequate job.
Lakeside	1. Mining. 2. Regulate use and carrying capacity. 3. Disperse use throughout wilderness system.
CARSON	
Canjilon	1. Wrong use of wilderness by people. 2. What is the line between nature taking its course and managing the wilderness (e.g., insects, fire). 3. Monitoring--what and how?

* Rangers without wilderness on their district responded to general management problems.
 Rangers with wilderness responded to problems specific to their areas.

Table 22, continued

NATIONAL FOREST**Ranger District Management Problems (in order of seriousness)**

El Rito	1. Management of recreational users. 2. Conflicts between wilderness and adjacent nonwilderness areas (insects, fire). 3. Public misunderstanding of what F.S. managers can do in managing wilderness.
Jicarilla	1. Foot travel vs. horse travel. 2. Setting capacities. 3. How to limit overuse in certain areas.
Penasco	1. No coordinated wilderness management, possibly one district [to] control entire wilderness. 2. Reduction in funding for wilderness. 3. Lack of trailhead facilities and trailhead vandalism.
Taos	1. Lack of money. 2. Lack of research in management techniques, especially use levels, ceilings, etc. 3. Lack of expertise.
Tres Piedras	1. Range Management--restrictions of improvements. 2. Boundary identification. 3. Vehicle intrusions into the wilderness.
Questa	1. Overuse by recreators in certain areas. 2. Insufficient law enforcement (vehicle intrusions, litter, vandalism, etc.). 3. Inadequate funds to best manage wilderness.
CIBOLA	
Mt. Taylor	1. Overuse. 2. Disperse use in wilderness area. 3. Making recreation a major use of wilderness areas instead of moving recreation to other areas.
Magdalena	1. Lack of funding. 2. Vehicle intrusions. 3. Need for wilderness boundary signing on the land (wilderness hasn't been surveyed).
Mountainair	1. Use of modern fire-fighting techniques (a cumbersome method to get approval). 2. Bears eating signs. 3. Trash from users.

Table 22, continued

NATIONAL FOREST

<u>Ranger District</u>	<u>Management Problems (in order of seriousness)</u>
Sandia	<ol style="list-style-type: none"> 1. Impacts from urban area (recreational vehicles, bicycles, etc.). 2. Sign vandalism. 3. Need more trail maintenance.
Black Kettle	<ol style="list-style-type: none"> 1. Lack of management, might not have proper techniques. 2. Getting public's perspective rather than special interest groups.
Kiowa N.G.	<ol style="list-style-type: none"> 1. Concentrated use. 2. Recreation use vs. grazing conflict. 3. Conflicts between horse and foot use.
Rita Blanca	<ol style="list-style-type: none"> 1. Degradation of resources. 2. Educate people with wrong expectations. 3. Conflict with timber and range industry.
COCONINO	
Beaver Creek	<ol style="list-style-type: none"> 1. Overuse and overcrowded. 2. Difficult to assess impacts. 3. Inadequate funds.
Elden	<ol style="list-style-type: none"> 1. Recreational vehicle intrusion. 2. Determining carrying capacity. 3. Managing to capacity.
Flagstaff	<ol style="list-style-type: none"> 1. Use and management of people. 2. Fire management--what will our approach be? 3. Need for more money to manage wilderness properly.
Long Valley	<ol style="list-style-type: none"> 1. Protect riparian environment. 2. Overuse. 3. Protect cultural resources.
Mormon Lake	<ol style="list-style-type: none"> 1. Designation as "wilderness" encourages overuse. 2. Inadequate funds for management. 3. Areas that don't close themselves naturally, i.e., open access where vehicles can drive in.
Sedona	<ol style="list-style-type: none"> 1. Inadequate funding for personnel. 2. Inconsistent management due to sporadic funding.
Blue Ridge	<ol style="list-style-type: none"> 1. Cultural resource sites. 2. Overuse. 3. Competition between people and grazing.

Table 22, continued

NATIONAL FOREST**Ranger District Management Problems (in order of seriousness)****CORONADO**

Douglas	1. Fuels accumulation and buildup. 2. Trail erosion. 3. Soil and vegetation impact.
Nogales	1. Boundary location--survey the land. 2. Access-right of ways and roads. 3. Budget and personnel ceilings.
Safford	1. Inadequate funding to monitor. 2. Management of the buffer areas located adjacent to wilderness. 3. Getting accurate use records.
Sierra Vista	1. Overcrowding. 2. Dispersion of uses. 3. Law enforcement--vehicular intrusions.
Santa Catalina	1. Inadequate funding. 2. Lack of management differences between different wilderness areas on the spectrum (urban--pristine). 3. Boundary area between urban and wilderness areas.

GILA

Black Range	1. Adequate access to wilderness by all. 2. Lack of money and manpower to manage lands. 3. Lack of wilderness information.
Luna	1. Grazing in wilderness (without mechanized processes). 2. Search and rescue (mechanized processes). 3. Trail management, lack of mechanized equipment.
Glenwood	1. Carrying capacity ceilings. 2. Coordinating outside uses so search and rescue doesn't violate wilderness laws. 3. Mining--some conflicts with recreation.
Mimbres	1. Inadequate funding to manage well. 2. Inadequate trail maintenance. 3. Lack of personnel.
Reserve	1. Use concentrations in popular areas. 2. Inadequate trail maintenance. 3. Vehicle intrusions.

Table 22, continued

NATIONAL FOREST	
<u>Ranger District</u>	<u>Management Problems (in order of seriousness)</u>
Silver City	<ol style="list-style-type: none"> 1. Inadequate funding. 2. FTEs. 3. Political aspects of grazing.
Wilderness	<ol style="list-style-type: none"> 1. Inadequate funding. 2. Inadequate personnel. 3. Correcting past vegetation manipulations.
Quemado	<ol style="list-style-type: none"> 1. Inadequate budget. 2. Insufficient FTEs. 3. Determining wilderness carrying capacity.
KAIBAB	
Williams	<ol style="list-style-type: none"> 1. Inadequate funding. 2. Personnel ceilings. 3. Lack of data base.
Chalender	<ol style="list-style-type: none"> 1. Overuse. 2. Inadequate funding. 3. Insufficient FTEs.
North Kaibab	<ol style="list-style-type: none"> 1. Inadequate funding. 2. Grazing vs. recreational use. 3. Control of livestock by recreational use.
Tusayan	<ol style="list-style-type: none"> 1. Locals who use wilderness as they use other multiple use F.S. land. 2. Recreational vehicle use. 3. Mining disturbances.
LINCOLN	
Smokey Bear	<ol style="list-style-type: none"> 1. Inadequate trail maintenance due to primitive means to do it. 2. Inadequate access to wilderness. 3. Inadequate funds (for trails and WIS).
Cloudcroft	<ol style="list-style-type: none"> 1. Overuse of popular areas. 2. Inadequate funding. 3. Hand labor for maintenance.
Guadalupe	<ol style="list-style-type: none"> 1. Fire--will be the biggest natural impact on wilderness. 2. People impacts; determine carrying capacities area by area. 3. Natural elements in wilderness which may be necessary for use in the future (minerals, etc.).
Mayhill	<ol style="list-style-type: none"> 1. Access to the wilderness, hinders dispersion. 2. Inadequate funding for trail maintenance. 3. Erosion and impacts by users.

Table 22, continued

NATIONAL FOREST

Ranger District Management Problems (in order of seriousness)

PRESCOTT

Chino Valley	1. Access. 2. Trails. 3. Lack of water.
Bradshaw	1. Inadequate funding. 2. Lack of personnel. 3. Inadequate data on users and resource.
Verde	1. Inadequate funding. 2. Variance in interpretation of Wilderness Act within F.S. 3. Lack of consistency among personnel in the F.S.

SANTA FE

Coyote	1. Vehicular intrusion. 2. Lack of boundary posters. 3. Overgrazing. 4. Spruce budworm infestation.
Cuba	1. Conflicts between range and wildlife because New Mexico Game and Fish want to exclude grazing in the wilderness. 2. Meadow character of the wilderness, distracts from more potential wilderness use.
Jemez	1. User impacts on soils and vegetation. 2. Consistency between National Park Service and Forest Service. 3. Provide contact (one-on-one) between users and F.S. personnel (user education).
Las Vegas	1. Trailhead vandalism. 2. Degradation of high mountain lakes. 3. Trail degradation.
Pecos	1. Overuse in riparian areas. 2. Visitor education, encouraging better wilderness ethics. 3. Conflict between elk and cattle use.
Tesuque	1. Inadequate funds. 2. Inadequate visitor education program. 3. Inadequate trail maintenance.
Espanola	1. Vandalism and theft. 2. Poor wilderness ethics by some users. 3. Motorized use, 3-4 times per year.

Table 22, continued

NATIONAL FOREST**Ranger District Management Problems (in order of seriousness)****TONTO**

Cave Creek	1. Range management procedures for use of mechanized equipment for improvements, what is the accommodation? 2. Inadequate trail funding.
Globe	1. Boundary identification and defense. 2. Vehicular intrusion.
Mesa	1. Conflict between wilderness and mining. 2. Fair, reasonable carrying capacity definitions. 3. Lack of alternate areas for recreation.
Payson	1. Inadequate funds. 2. Lack of personnel.
Pleasant Valley	1. Monitoring of current use. 2. Access. 3. Adequate trail maintenance.
Tonto Basin	1. Inadequate funding. 2. Unmanageable boundaries. 3. Recreational vehicle intrusion.

WILDERNESS TECHNOLOGY TRANSFER

In the final segment of the interview, district rangers were asked to identify sources of information regarding improved wilderness management and how they typically learned better ways to manage wilderness. The purpose of this inquiry was to examine the means and effectiveness of current technology transfer efforts and to incorporate the results into improved communication channels in technology transfer planning.

Sources of Information Regarding Wilderness Management. The 64 district rangers were asked to identify three sources of information about wilderness management they found most helpful (Table 23). The most common source of helpful information was wilderness schools or workshops, as identified by 40 of the 64 southwestern district rangers. The second most common source was research literature, mentioned by 35 district rangers. Communication with other wilderness managers was identified by 29 district rangers and literature distributed interoffice or

inter-Forest Service was mentioned by 24 district rangers. Ten district rangers identified wilderness users as a source of helpful information and ten also mentioned popular literature. The Forest Service manual, directives, policy and management reviews were also listed by several district rangers. The wilderness management textbook was only mentioned by four district rangers.

The results were quite similar when the 40 wilderness district rangers were analyzed independently from the 24 nonwilderness district rangers. Over half ($N = 23$) of the 40 wilderness district rangers identified wilderness schools or training workshops as a helpful source of information. The second most common source was research literature, mentioned by 22 wilderness district rangers. Literature distributed interoffice or inter-Forest Service was identified by 20 wilderness district rangers and 17 referred to communication with other wilderness managers as a helpful source of information.

The wilderness-related conferences, workshops, and training sessions were perceived as very important, therefore, we asked both wilderness and nonwilderness district rangers how frequently they attended such events. Eleven district rangers said they had attended at least one professional wilderness-related conference, excluding training workshops, during the last year. Four district rangers attended conferences that were outside Region 3. Only six of the 11 district rangers who attended the professional conferences were managing wilderness at the time of the study.

Twenty district rangers had attended one or more wilderness schools or training workshops in the last year, which included 15 district rangers with wilderness responsibility. Only four district rangers had attended training workshops outside of Region 3.

All district rangers were asked if the frequency of their attendance at professional meetings, workshops, or conferences during the past year had remained stable, increased or decreased. Twenty-seven district rangers (42%) said frequency of attendance had remained stable, 25 (39%) said frequency was less, and 12 (19%) said frequency had increased. Of the 12 rangers who had attended more professional workshops or conferences in the past year, seven were wilderness district rangers, and one was a new (1984) wilderness district ranger. It is interesting to note that 14 wilderness district rangers and five new (1984) wilderness district rangers had experienced a decrease in frequency of attendance at professional workshops or conferences in the past year.

Among the 40 wilderness district rangers, only five said they had not had conversations with professional colleagues outside their district in the past year concerning wilderness. Twenty-six of the wilderness district rangers had three or more such conversations. The mean number of conversations for wilderness district rangers was 9.9. Only six of all conversations were outside the region.

Among the seven new (1984) wilderness district rangers, only one ranger had zero conversations with colleagues outside the district concerning wilderness management. The average number of such conversations was 11.4. Many of these related to Rare II issues and passage of the Arizona wilderness legislation.

TABLE 23

Sources of Information about Wilderness Management,
 Professional Conferences/Training Workshops, and
 Meetings or Phone Conversations with Colleagues
 Dealing with Wilderness Management
 - September 1983-September 1984 -

NATIONAL FOREST Ranger District	District Ranger's Most Helpful Sources of Wilderness Management Information (rank ordered)	Professional Conferences			Meetings and Phone Conversations			Comparison With Number in Previous Years	
		Professional Conferences		Training Workshops	Outside Region		Outside Region	#	Region
		#	Region	#	Region	#	Region	#	Region
APACHE-SITGREAVES									
Alpine	1. Contacts with other wilderness managers, F.S. and other agencies. 2. Literature--casual and philosophical, more than research. 3. Workshops.	Ø		Ø		6	Ø	About the same.	
Clifton	1. Wilderness seminars. 2. Publications, memos, e.g., from other areas. 3. Special interest groups.	Ø		Ø		1	Ø	About the same.	
Chevelon	1. F.S. research, other wilderness management agencies. 2. Wilderness users. 3. The environment itself, through monitoring.	Ø		Ø		Ø		About the same.	
Heber	1. Workshops and formal training sessions. 2. In-house literature. 3. Publications.	1		Ø		Ø		Somewhat more.	
Springerville	1. Workshops and conferences. 2. Pamphlets, articles, magazines (internal reports).	Ø		1	Ø	6	Ø	Somewhat fewer.	
Lakeside	1. Training workshops. 2. Training brochures. 3. Publications (especially Westfornet).	1	(Missoula, Ø Montana, "It was excellent")	Ø		Ø		Far fewer.	

Table 23, continued

NATIONAL FOREST Ranger District	District Ranger's Most Helpful Sources of Wilderness Management Information (rank ordered)	Professional Conferences		Meetings and Phone Conversations		Comparison With Number in Previous Years
		Outside Region	#	Outside Region	#	
CARSON						About the same.
Canjilon	1. Interim wilderness plan. 2. Unapproved Santa Fe forest plan. 3. Forest Service manual.	Ø		Ø	Ø	About the same.
E1 Rito	1. Workshops and formal training. 2. Research papers. 3. Communication between managers and all F.S. people as well as recreation users.	Ø		Ø	1 Ø	Somewhat fewer.
Jicarilla	1. Personal contact with users. 2. Forests with wilderness areas. 3. Training workshops.	Ø		Ø	Ø	About the same.
Penasco	1. F.S. manual. 2. Westfornet. 3. Training workshops.	Ø		1 Ø	2 Ø	About the same.
Taos	1. Information from users. 2. Journals. 3. Other F.S. personnel.	Ø		Ø	6 Ø	Far fewer.
Tres Piedras	1. Research articles and pamphlets through F.S. distribution. 2. Wilderness management policies and plans from other wilderness areas. 3. Word of mouth from S.O. recreation staff.	Ø		Ø	5 Ø	Far more.
Questa	1. Training seminars, exchange ideas with other managers. 2. Research publications. 3. Day-to-day problem solving.	Ø		Ø	4 1	Somewhat more.
CIBOLA						About the same.
Mt. Taylor	1. Talk to wilderness managers. 2. Wilderness ranger workshops. 3. Periodicals and publications.	Ø		Ø	2 2	About the same.

Table 23, continued

NATIONAL FOREST Ranger District	District Ranger's Most Helpful Sources of Wilderness Management Information (rank ordered)	Professional Conferences		Training Workshops		Meetings and Phone Conversations		Comparison With Number in Previous Years
		#	Region	#	Region	#	Region	
Magdalena	1. F.S. newsletters, magazines, journals. 2. Other's experience (both F.S. and public). 3. In-house training sessions.	Ø		Ø		6	Ø	Somewhat more.
Mountainair	1. Word of mouth by F.S. wilderness managers. 2. Brochures on other F.S. managers' experiences.	Ø		Ø		Ø		About the same.
Sandia	1. Personal common sense/own viewpoint. 2. Volunteers and F.S. personnel feedback. 3. Research literature and F.S. reports on other wilderness areas.	Ø		Ø		3	Ø	About the same.
Black Kettle	1. Wilderness management plans for review. 2. Wilderness society. 3. Seminars.	Ø		Ø		2	Ø	Far fewer.
Kiowa N.C.	1. Books. 2. Training systems. 3. Talk with wilderness managers.	2		Ø		Ø		About the same.
Rita Blanca	1. S.O. recreation specialists. 2. Wilderness workshops. 3. Compare notes with other wilderness managers.	Ø		Ø		Ø		Far more.
COCONINO								
Beaver Creek	1. Current wilderness management plans in F.S. 2. Personal contact with people who have done wilderness management. 3. Research notes and Westfornet.	Ø		12		Ø		About the same.
Elden	1. Workshops. 2. Research publications.	Ø		1		Ø		Somewhat fewer.

Table 23, continued

<u>NATIONAL FOREST Ranger District</u>	<u>District Ranger's Most Helpful Sources of Wilderness Management Information (rank ordered)</u>	<u>Professional Conferences</u>		<u>Training Workshops Outside Region</u>		<u>Meetings and Phone Conversations Outside Region</u>		<u>Comparison with Number in Previous Years</u>
		#	Region	#	Region	#	Region	
Flagstaff	1. Share ideas with other wilderness managers. 2. Trial and error. 3. Research (not many answers here, it's often impractical).	Ø		Ø		1	Ø	About the same.
Long Valley	1. Help from experienced wilderness managers. 2. F.S. manual. 3. Publications of all sorts, mostly research.	Ø		Ø		6	Ø	Somewhat fewer.
Mormon Lake	1. Talking to people. 2. Training workshops. 3. Reports on wilderness management.	Ø		Ø		10	Ø	Far more.
Sedona	1. Wilderness schools and workshops. 2. Public comments.	1	Ø	1	Ø	5	Ø	About the same.
Blue Ridge	1. Networking with another person. 2. F.S. manual. 3. Publications.	Ø		Ø		15	Ø	Far more.
CORONADO						Ø		
Douglas	1. Mail correspondence from F.S. 2. Wilderness workshops. 3. Coronado N.F. wilderness coordinating committee.	Ø		Ø		Ø		About the same.
Nogales	1. F.S. manual. 2. Wilderness management book. 3. Personal contacts (mostly with volunteers and office visitors).	Ø		1	Ø	Ø		Far fewer.
Safford	1. Comments from users (recreation and permittees). 2. Publications and bulletins. 3. Workshops.	1	1	Ø		2	Ø	Far fewer.

Table 23, continued

NATIONAL FOREST Ranger District	District Ranger's Wilderness Management Information (rank ordered)	Most Helpful Sources of Wilderness Management Information (rank ordered)	Professional Conferences Outside Region		Training Workshops Outside Region		Meetings and Phone Conversations Outside Region		Comparison With Number in Previous Years	
			#	Region	#	Region	#	Region	#	Region
Sierra Vista	1. Wilderness management book. 2. F.S. manual. 3. Training sessions.	Ø			1	Ø	9	Ø	Somewhat more.	
Santa Catalina	1. On the ground observation. 2. Reports by users and workers. 3. Wilderness user groups.	Ø					15	Ø	About the same.	
GILA										
Black Range	1. R & L staff to national recreation workshop in Utah. 2. F.S. publications. 3. Wilderness society information.	Ø			1	1	15	Ø	Somewhat fewer.	
Luna	1. Regional seminars (best source of information). 2. Articles sent from R.D. to R.D. 3. Professional magazines and journals.	Ø			Ø		5	Ø	About the same.	
Glenwood	1. Wilderness workshop. 2. Current literature. 3. Talk to other wilderness managers.	1	Ø		1	Ø	20	Ø	Far more.	
Mimbres	1. Training workshops. 2. Experience-oriented documents and papers. 3. Journal, research oriented.	Ø			1	Ø	25	Ø	Somewhat fewer.	
Reserve	1. Wilderness workshops. 2. Written materials (F.S. routing). 3. Word of mouth by F.S. personnel.	Ø			Ø		4	1	About the same.	
Silver City	1. Talking to other managers (National Park Service and Forest Service). 2. Publications (pamphlets, books, articles). 3. Training workshops.	Ø			Ø		6	Ø	Somewhat fewer.	

Table 23, continued

NATIONAL FOREST Ranger District	District Ranger's Most Helpful Sources of Wilderness Management Information (rank ordered)	Professional Conferences		Training Workshops Outside Region		Meetings and Phone Conversations Outside Region		Comparison With Number in Previous Years
		#	Region	#	Region	#	Region	
Wilderness	1. Wilderness Act. 2. Experience of wilderness managers. 3. Wilderness school, training workshops.	Ø		Ø		150	2	Somewhat fewer.
Quemado	1. Special interest group publications. 2. In-house memos and mailings. 3. Wilderness management symposia.	Ø		Ø		3	Ø	About the same.
KAIBAB								
Williams	1. National Park Service publication on wilderness management (an abstract of wilderness writings). 2. Periodicals, e.g., Journal of Forestry. 3. Westfornet.	Ø		1	Ø	Ø		Far fewer.
Chalender	1. F.S. direction and directives. 2. Research publications. 3. F.S. publications on wilderness management.	Ø		1	Ø	Ø		About the same.
North Kaibab	1. Wilderness management plans done on other areas. 2. Westfornet and other publications. 3. Wilderness and recreation workshops.	1	1 (in Region 1)	2	2	2	Ø	Somewhat fewer.
Tusayan	1. Seminars. 2. On-ground observations of other wilderness areas. 3. Written documents, especially other managers' experiences.	Ø		Ø		6	Ø	Far fewer.
LINCOLN								
Smoky Bear	1. Workshops. 2. Publications (research papers, wilderness management text). 3. Management plans, F.S. manual.	Ø		2	Ø	30	1	About the same.

Table 23, continued

NATIONAL FOREST Ranger District	District Ranger's Most Helpful Sources of Wilderness Management Information (rank ordered)	Professional Conferences		Training Workshops		Meetings and Phone Conversations		Comparison With Number in Previous Years
		#	Outside Region	#	Outside Region	#	Outside Region	
Cloudcroft	1. Workshops--best information source. 2. Westfornet. 3. Wilderness manager contacts.	Ø		Ø		Ø		Somewhat fewer.
Guadalupe	1. Wilderness managers with similar areas. 2. Workshops and seminars (F.S. and National Park Service). 3. Publications.	Ø		Ø		6	Ø	About the same.
Mayhill	1. Journals and other periodicals. 2. Wilderness management book.	Ø		1	Ø	Ø		About the same.
PRESCOTT				Ø		6	Ø	About the same.
Chino Valley	1. In-service publications. 2. Outside publication.	Ø		Ø		50 (Rare II issues)		Far fewer.
Bradshaw	1. Dialogue between managers and per- sonnel. 2. Workshops. 3. Publications, research articles.	1	Ø	Ø		1	Ø	Somewhat fewer.
Verde	1. On-job training and experience. 2. Reading on problem solving in other areas. 3. Talking to others.	Ø		Ø		2	Ø	Far more.
SANTA FE								
Coyote	1. Literature through F.S. people. 2. Research articles and Westfornet. 3. Management and administrative re- views.	Ø		Ø		2	Ø	About the same.
Cuba	1. Wilderness management text. 2. Workshops. 3. Feedback from users.	2	Ø	Ø		12	Ø	About the same.
Jemez	1. Talk to users. 2. Talk to F.S. personnel in D.O.	Ø		Ø		Ø		Far fewer.

Table 23, continued

NATIONAL FOREST Ranger District	District Ranger's Most Helpful Sources of Wilderness Management Information (rank ordered)	Professional Conferences		Meetings and Phone Conversations Outside Region		Comparison With Number in Previous Years
		#	Outside Region	#	Outside Region	
Las Vegas	1. F.S. memos with publications. 2. Contacts with Forest and Regional Personnel. 3. Westfornet.	Ø		2	Ø	3
Pecos	1. Papers routed by F.S. 2. Workshops. 3. Journal of Forestry.	1	1	7	7	15
Tesuque	1. Actively managing, trying things. 2. Experience of other F.S. Personnel. 3. Research.	Ø		Ø		10
Espanola	1. Other managers. 2. User suggestions. 3. Westfornet.	Ø		Ø		4
TONT				Ø		12
Cave Creek	1. Hardback books with F.S. co- sponsorship. 2. Research projects, e.g., disser- tations and theses. 3. Experiment station research papers.	Ø		Ø		4
Globe	1. In-house discussion with F.S. 2. In-house F.S. direction (mailings, memos, etc.). 3. Formal training.	Ø		Ø		6
Mesa	1. National or regional on-site workshops. 2. Printed material. 3. Communication with all types of people.	Ø		2	1	50

Table 23, continued

<u>NATIONAL FOREST Ranger District</u>	<u>District Ranger's Most Helpful Sources of Wilderness Management Information (Rank Ordered)</u>	<u>Professional Conferences</u>		<u>Training Workshops</u>		<u>Meetings and Phone Conversations Outside Region</u>		<u>Comparison With Number in Previous Years</u>
		#	Region	#	Region	#	Region	
Payson	1. Westfornet. 2. National Recreation and Park Association affiliation. 3. Workshops and meetings.	1	Ø	1	Ø	6	1	About the same.
Pleasant Valley	1. Training workshops (best source). 2. Current literature.	Ø		1	Ø	3	Ø	Somewhat fewer.
Tonto Basin	1. Training workshops (best source). 2. Cooperative efforts with other districts. 3. Literature and articles.	Ø		Ø		2	Ø	About the same.

Knowledge of Experiment Stations and Researchers. Research literature was perceived as an important source of information for wilderness management by over half ($N = 35$) of the 64 district rangers, as presented in the previous section. Research is one of the primary goals of the Forest Service Experiment Stations as they seek to provide information for improved national forest management. Research that is directly applicable to wilderness management is conducted at the Intermountain and Northeastern stations. Research mandates have prompted some wilderness research at the Rocky Mountain, Pacific Northwest, North Central, and Southeastern stations. These units have been a valuable source of new information and innovations regarding wilderness management, therefore the district rangers were asked about their awareness of experiment stations that conduct wilderness research (Table 24).

Overall, 24 (38%) of the 64 southwestern district rangers could identify by name or location at least one experiment station that conducts wilderness-related research. An additional eight district rangers said they knew of them but couldn't identify any. Only eighteen of the district rangers who could identify experiment stations were currently managing wilderness. Only two of the seven new (1984) wilderness district rangers could identify an experiment station.

Most district rangers that could identify a wilderness-related research station could list only one, however seven rangers listed two and one ranger identified three. The Intermountain Station was identified by name or location by 11 district rangers. The Rocky Mountain Station was listed by nine rangers and the Pacific Northwest Station was mentioned by seven district rangers. Three district rangers mentioned the station in Tempe, Arizona; one ranger identified the Southeastern Station, and one listed the Northeastern station.

All but three of the southwestern district rangers said they received the list of experiment station publications, and all but seven said they received other publications from the experiment stations. Thirty-five (55%) of the 64 rangers said they have the text, *Wilderness Management*, by Hendee, Stankey, and Lucas (1978). Twelve (30%) of the 40 wilderness district rangers did not have the text and two of the seven new (1984) wilderness district rangers did not have the text.

District rangers were also asked to identify names of individuals who have conducted wilderness research. Twenty-one (33%) of the 64 district rangers identified at least one researcher, six identified two researchers, and nine identified three or more (Table 24). These figures should be interpreted with caution, as several rangers identified the interviewer and several rangers identified Forest Service employees who are not actively involved in wilderness research as a major responsibility (e.g., Steve Reiser, Ed Bloedel, Ron Henderson). The most commonly identified researchers were George Stankey, John Hendee, and Robert Lucas.

TABLE 24
Ranger Knowledge of Experiment Stations and Wilderness Researchers;
Possession of Wilderness Management Text

NATIONAL FOREST Ranger District	Knowledge of Experiment Stations doing Wilderness Research	Receive List of Exp. Station Publications		Receive any Publications		Knowledge of Wilderness Researchers	Possession of Wilderness Management Text
		Receive List of Exp. Station Publications	Receive any Publications	Receive any Publications	Receive any Publications		
APACHE-SITGREAVES							
Alpine	None.	Yes	Yes	Yes	None.	Yes	Yes
Clifton	None.	Yes	Yes	Yes	None.	No	No
Chevelon	None.	Yes	Yes	Yes	None.	No	No
Heber	None.	Yes	Yes	Yes	None.	No	No
Springerville	None.	Yes	Yes	Yes	None.	Yes	Yes
Lakeside	1. Northeast Exp. Station (Boundary Waters). 2. Intermtn Exp. Station.	Yes	No	None.	No	No	No
CARSON							
Canjilon	Know of them, but can't identify any.	Yes	No	No	None.	No	No
El Rio	None.	Yes	Yes	Yes	None.	No	No
Jicarilla	None.	No Response	No Response	No Response	None.	No	No
Penasco	Know of them, but can't identify any.	Yes	Yes	Yes	None.	No	No
Taos	None.	Yes	Yes	Yes	None.	No	No
Tres Piedras	1. Rocky Mtn. Exp. Stn.	Yes	Yes	Yes	None.	Yes	Yes
Questa	1. Fort Collins, CO (Region 2).	Yes	Yes	Yes	None.	Yes	Yes

Table 24, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Knowledge of Experiment Stations doing Wilderness Research</u>	<u>Receive List of Exp. Station Publications</u>	<u>Receive any Publications</u>	<u>Wilderness Researchers</u>	<u>Possession of Wilderness Management Text</u>
CIBOLA					
Mt. Taylor	1. Missoula, Montana.	Yes	Yes	1. Beth Ramz (U/Montana thesis) 2. Jim Bradley	Yes
Magdalena	1. Pacific N.W.	Yes	Yes	None.	Yes
Mountainair	None.	Yes	Yes	None.	No
Sandia	1. The one in Colorado.	Yes	Yes	1. John Hendee 2. George Stankay 3. Roderick Nash	Yes
Black Kettle	None.	Yes	No	None.	No
Kiowa N.G.	None.	Yes	Yes	None.	No
Rita Blanca	None.	Yes	Yes	None.	No
COCONINO					
Beaver Creek	None.	Yes	Yes	None.	No
Elden	1. Northwest.	Yes	Yes	1. John Hendee 2. Roger Clark	Yes
Flagstaff	1. Intermountain. 2. Pacific Northwest.	Yes	Yes	None.	No
Long Valley	None.	Yes	Yes	None.	Yes
Mormon Lake	None.	Yes	Yes	None.	No
Sedona	None.	No	No Response	None.	Yes
Blue Ridge	1. Rocky Mountain. 2. Intermountain.	Yes	Yes	1. Margaret Petersen 2. George Stankay	No
CORONADO					
Douglas	None (suspect that they all do some).	Yes	Yes	None.	Yes

Table 24, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Knowledge of Experiment Stations doing Wilderness Research</u>	<u>Receive List of Exp. Station Publications</u>	<u>Receive any Publications</u>	<u>Wilderness Researchers</u>	<u>Possession of Wilderness Management Text</u>
Nogales	None.	Yes	Yes	None.	Yes
Safford	Don't know which ones.	Yes	Yes	1. J. Alan Wager	Yes
Sierra Vista	None.	Yes	Yes	None.	Yes
Santa Catalina	1. Southern Exp. Stn. (where John Hendee is).	Yes	Yes	1. John Hendee 2. George Stankey 3. Robert Lucas	Yes
GILA					
Black Range	None.	No	Yes	1. Steve Rieser 2. Ron Henderson 3. Hunter Wistrand	Yes
Luna	1. Rocky Mtn (in Tempe).	Yes	Yes	1. Dietrich (Tempe, fire mgt, Ret.)	Yes
Glenwood	1. Rocky Mountain. 2. Missoula, Montana.	Yes	Yes	None.	Yes
Mimbres Reserve	1. Tempe (fish, grazing, fire).	Yes	Yes	1. Tom Sweatman	No
Silver City	1. Tempe (wilderness fire mgt).	Yes	Yes	None.	No
Wilderness Quemado	None.	Yes	Yes	1. John Hendee 2. George Stankey 3. Robert Lucas	Yes
KIABAB	Know of them, but can't identify names.	Yes	Yes	1. Margaret Petersen 2. George Stankey	No
Williams	Know of them, but can't identify names.	Yes	Yes	None.	No
	Don't know names; would ask them for help, however.	Yes	Yes	None.	No

Table 24, continued

NATIONAL FOREST Ranger District	Knowledge of Experiment Stations doing Wilderness Research	Receive List of Exp. Station Publications		Receive any Publications		Knowledge of Wilderness Researchers	Possession of Wilderness Management Text
		Yes	No	Yes	No		
Chalender	None.	Yes		Yes		1. Graduate students 2. Wilderness specialists	Yes
North Kaibab	1. Intermountain. None.	Yes		Yes		None.	No
Tusayan	None.	Yes		Yes		None.	No
LINCOLN							
Smokey Bear	1. Rocky Mountain.	Yes		Yes		1. Roger Clark 2. John Hendee 3. Bev Driver 4. Rachel Robertson 5. Keith Alexander 6. Colo State Univ people 7. Sue Allen	Yes
Cloudcroft	1. Pacific Northwest.	Yes		Yes		None.	No
Guadalupe	None.	Yes		Yes		None.	Yes
Mayhill	None.	Yes		Yes		None.	No
PREScott							
Chino Valley	None.	Yes		Yes		1. Keith Alexander	Not sure
Bradshaw	None.	Yes		Yes		None.	Yes
Verde	1. Rocky Mountain. 2. Pacific Northwest. 3. Intermountain.	Yes		Yes		1. Keith Alexander	Yes
SANTA FE							
Coyote	None.	Yes		Yes		None.	No
Cuba	1. Northwest.	Yes		Yes		1. John Hendee 2. Roger Clark 3. Keith Alexander	Yes

Table 24, continued

<u>NATIONAL FOREST Ranger District</u>	<u>Knowledge of Experiment Stations doing Wilderness Research</u>	<u>Receive List of Exp. Station Publications</u>	<u>Receive any Publications</u>	<u>Knowledge of Wilderness Researchers</u>	<u>Possession of Wilderness Management Text</u>
Jemez	None.	Yes	Yes	None.	No
Las Vegas	None.	Yes	Yes	None.	No
Pecos	None.	Yes	Yes	1. George Stankey 2. Robert Lucas 3. John Hendee	Yes
Tesuque	1. Region 1.	Yes	Yes	1. Bev Driver 2. Wendel Beardsley	Yes
Espanola	None.	Yes	Yes	1. Bev Driver	Yes
Tonto					
Cave Creek	1. Pacific Northwest. 2. Intermountain.	Yes	Yes	None.	Yes
Globe	Know of some, but can't name them.	Yes	Yes	None.	Yes
Mesa	1. Intermountain.	Yes	No		
Payson	1. Intermountain. 2. Rocky Mountain. 3. Various universities (grants).	Yes	Yes	1. Robert Lucas 2. George Stankey 3. Margaret Petersen	Yes
Pleasant Valley	1. Missoula, Montana. 2. Rocky Mountain.	Yes	Yes	1. Rachel Robertson 2. Bev Driver	Yes
Tonto Basin	None.	Yes	Yes	1. Rachel Robertson 2. Robert Lucas 3. Keith Alexander 4. Ed Bloede	Yes

CHAPTER III

SUMMARY AND TECHNOLOGY TRANSFER IMPLICATIONS

The focus of this study was the wilderness management practices, philosophies, perceptions of problems, and areas of informational need of the district rangers in the Southwestern Region of the USDA Forest Service. The sample population included the 64 district rangers in Arizona and New Mexico. Interviews were conducted during the summer and fall, 1984.

The purpose of this chapter is to summarize the nature and dimension of wilderness management in the Southwest and to identify implications for technology transfer based on these results. Recommendations for future wilderness management planning are provided in the last chapter.

MANAGER'S WORK EXPERIENCE

The range of experience for managing wilderness was from zero to 22 years for the 64 district rangers. Wilderness district rangers averaged 9.7 years, although two of the new (1984) wilderness district rangers had no previous wilderness responsibility. There is a need to target technology to those rangers who are less experienced in wilderness management. In addition, the turnover rate of district rangers with wilderness management experience is relatively rapid; therefore, technology transfer must be continuous and targeted to the newly acquired positions.

Many of the wilderness district rangers had been either a district ranger or recreation and lands staff in one of their two previous positions. It would be useful for administrators to view these positions as wilderness management training grounds for future wilderness responsibility. The recreation and lands staff and nonwilderness district rangers should be targeted for transfer of wilderness information simultaneously with the wilderness district rangers and should be encouraged

to keep pace with current wilderness management research and innovations. The recreation and lands staff and nonwilderness district rangers should also be included in wilderness management training workshops and conferences.

Nineteen of the wilderness district rangers had been range staff and ten had been timber staff in one of their two previous positions. The timber and range management experience suggests training and expertise in these functional areas, and a potential need for information about managing wilderness. Timber and range management staff should be provided basic wilderness management training through formal and informal meetings, interoffice memos and literature, and occasional wilderness-related workshops.

MANAGER'S WILDERNESS PHILOSOPHY

Rangers were asked to identify what they perceived to be the primary values and benefits of wilderness. Their responses were categorized by the terms biocentric, meaning resource-oriented, and anthropocentric, meaning people-oriented. These terms have been utilized for descriptive purposes only, in order to explain the philosophical spectrum (see previous discussion, pp. 13-15). Neither the biocentric nor the anthropocentric philosophy should be used in isolation as applied to wilderness management. There is meant to be overlap between the terms as they represent a continuum of management orientations.

Findings regarding wilderness values and benefits indicate that the rangers in Region 3 reflect both the anthropocentric and biocentric philosophical orientations. Anthropocentric and biocentric values were equally represented as first choice benefits by the wilderness district rangers. Nonwilderness district rangers tended to choose people-oriented values. Almost all district rangers who listed a resource-oriented value also listed people-oriented values. However, 15 rangers (including eight wilderness district rangers) listed only people-oriented values. Of the 64 district rangers, 47 included both resource-oriented and people-oriented values.

These results indicate considerable agreement between the ranger's wilderness philosophy and the Wilderness Act mandate which requires both preservation of the resource and provision for primitive recreation experiences. It is difficult to determine the impact of wilderness philosophy on management strategies. For example, if a ranger identified all people-oriented values, his management style may be protective of those values (for example, solitude) and therefore protective of the resource. Alternatively, his management approach may provide for quantity in recreation at the cost of resource preservation. The important distinction is the extent to which the manager perceives the quality

of the recreation experience to be dependent upon the quality of the wilderness environment.

Educational efforts should continue to emphasize the need for balancing the "preservation and use" paradox. Dialogue that addresses the philosophical orientations should be encouraged among administrators, researchers, and managers. A foundation for such dialogue could be developed by encouraging district rangers to read the discussion on anthropocentric and biocentric wilderness philosophies in *Wilderness Management* (Hendee and others, 1978). Managers could thereby gain insight regarding the position of these three researchers and develop a common framework in terminology. The information could be condensed as an interoffice memo, which was found to be a popular form of technology transfer among the Region 3 district rangers. The philosophies could be related to a current management issue to overcome the abstract nature of such information. As dialogue regarding wilderness philosophy continues, administrators, researchers, and managers should perceive differences of opinion as a challenge rather than a stumbling block. The discussion should stimulate all personnel to define and refine their own philosophies and to evaluate them in relation to the original goals of the Wilderness Act.

The district ranger's philosophies regarding the proper role of the manager in achieving wilderness benefits ranged on a continuum from heavy-handed management to the more indirect management approach. Both management actions are appropriate, depending on the degree of regulation necessary to achieve wilderness management objectives. Regional and forest administrators should monitor and assess the appropriateness of management approaches. District rangers with similar user trends and management problems should work cooperatively to examine the effectiveness and appropriateness of their management styles. Managers should be encouraged to heed the guiding principle as presented by Hendee, Stankey and Lucas: "Only the minimum regulation necessary to achieve wilderness management objectives should be applied" (Hendee and others, 1978, p. 144).

Most district rangers felt wilderness facilitates the goals of multiple use management, although ten said that it conflicts and five said it both facilitates and conflicts with multiple use management. The findings indicate that much of the disagreement is over definition of multiple use management as opposed to whether wilderness is an appropriate and/or important component of the spectrum of Forest Service resource provisions. Rangers differed in their opinions regarding multiple use of each individual area versus multiple use of the forest as a whole with special uses for specific areas within the forest. Technology transfer efforts should be directed toward encouraging a common definition of the multiple use concept to enhance communication efforts when discussing concerns relevant to multiple use management.

Research findings indicated that creation of a separate backcountry system would be unpopular at the district level of the USDA Forest Service in the Southwest; 81 percent of the 64 district rangers opposed such action. This debate should continue as administrators seek solutions to overcrowding and overuse. Researchers should investigate the past impact of wilderness designation and the potential impact of backcountry designation.

WILDERNESS MANAGEMENT PLANNING

Most of the wilderness district rangers either had a wilderness management plan ($N = 26$) or were preparing or planned to prepare an implementation plan ($N = 11$). There was considerable dissatisfaction with the plans, especially because they were outdated; did not reflect accurate use levels, trends and predictions; and did not address multiple managers. Regional and forest administrators, as well as researchers, should consider these concerns regarding wilderness management plans as explicit areas of informational need. Rangers requested that their plans address management guidelines, tasks and concerns. An inventory of the wilderness as well as budgetary priorities were also requested. Technology is available to address all of these needs and some will be covered in the new land management plans. Issues that are not addressed should be targeted for innovative strategies to meet the needs. Rangers should be informed of current research innovations for determining use levels and making predictions. The use of volunteers could provide support in assessing accurate use levels and could assist with inventories of the wilderness areas.

Public involvement in the planning process has been generally inadequate. Technology transfer of public involvement strategies should address the need for going beyond the traditional public meeting to include more innovative and valid techniques for obtaining public input. Again, volunteers could be utilized to identify and target the appropriate public groups.

MONITORING TECHNIQUES FOR ENVIRONMENTAL CHANGE

Few wilderness district rangers in the Southwest monitored air quality (28%) and water quality (23%). Approximately half (53%) of the rangers monitored wildlife and fisheries, most commonly in cooperation with their respective Game and Fish Department. Almost all rangers (93%) monitored trail conditions, especially in conjunction with the trail maintenance program. Eighty percent of the rangers monitored campsite conditions, primarily by Forest Service personnel when in the field for other reasons. Vegetation was monitored by 73 percent of the rangers, usually in conjunction with range monitoring and analyses. Cultural

resource sites were monitored by 80 percent of the rangers, often by casual observation. Mining claims were monitored by 73 percent of the rangers. A variety of monitoring techniques were used for mining, including on-site inspection, B.L.M. claims listing, and Forest Service operating plan approval.

The need for technology transfer is most apparent for the wilderness district rangers who were not monitoring one or more of the environmental changes. In some districts, monitoring is unnecessary as it is accomplished by adjacent districts. In addition, some areas have limited use and require less monitoring. However, administrative planners should assess the potential need for monitoring and initiate technology transfer accordingly.

There is a pronounced need to develop and/or transfer research innovations for monitoring air, water, fisheries, and wildlife in Region 3. Where one wilderness is managed by two or more districts, personnel should be identified to coordinate and oversee the wilderness monitoring efforts. In such a case, specific monitoring responsibilities should be assigned to avoid duplication. District rangers who do monitor the various changes should be encouraged to use multiple techniques to enhance the validity of their monitoring results. Findings indicate a universal dependence on monitoring by visual observations, generally accomplished by Forest Service personnel or volunteers when in the field for other reasons. This indicates a need for innovative strategies to supplement reliance on casual observation.

District rangers varied in their degree of satisfaction regarding the various monitoring efforts. Rangers that were dissatisfied often said they would like to do more or that their monitoring does not provide accurate data. A large number of rangers felt that their monitoring was "adequate for their current levels of use." However, several of these same rangers felt that their monitoring of use levels, trends, and predictions was inadequate. These findings indicate that until districts have a good indication of visitor use and impact on their wilderness, it is necessary to monitor environmental change to avoid long-term impacts.

An important objective of technology transfer should be to achieve recognition of the need for monitoring among the district rangers--especially in relation to air, water, fisheries and wildlife. In addition, there is general satisfaction with monitoring strategies that are well defined. Therefore, an administrative challenge is to provide strategies that are specific, with measurable and attainable goals. Many rangers are aware of monitoring techniques and would like to do more, but simply do not have adequate resources to do what they deem necessary. These problems should be viewed as a challenge rather than a defeat. Researchers, administrators, and managers should work cooperatively to develop monitoring techniques that are well defined, low cost, and

accurate. Communication networks should be established and encouraged.

WATER RESOURCE MANAGEMENT

Only two wilderness district rangers reported having water resource management policies specific to their wilderness. Five additional district rangers anticipated adoption of an area specific policy. When the wilderness district rangers were asked about the general water resource management policy that then applied to their wilderness, a variety of responses were given (such as state or federal water laws, forest policy, regional policy). Technology transfer efforts should be directed toward developing a common understanding of present rules and regulations. An assessment should be initiated to determine the need for area-specific water management policies in each district.

SITE MANAGEMENT

Approximately half (53%) of the wilderness district rangers had programs to disperse recreational use. The most common approach was to inform visitors in the district office about alternative areas. Several rangers used alternative and/or innovative means to disperse use, including trail closure, establishment of new trails, establishment of no-camping areas, and right-of-ways on adjacent land. Seven rangers said they would like to do more with their dispersion program. Dispersion innovations should be transferred to the district rangers who wish to increase use dispersal. Communication networks should be established and encouraged between the district rangers who currently disperse use and the rangers who want to increase dispersion. Evaluation criteria should be developed and/or utilized to determine the effectiveness of current dispersion efforts. The evaluative results should be used to guide dispersion strategies in other districts.

Only six wilderness district rangers had purposefully concentrated use. Concentration methods included sacrifice areas, establishment of fire rings, trail closure, maintaining some trails better than others, establishment of no-camping areas, and education efforts. Most rangers were satisfied with their concentration program. However, one ranger expressed a need for determining whether dispersion or concentration is better for specific areas. Technology should be targeted to meet this area of informational need throughout the region.

Revegetation attempts have been initiated in four wilderness districts. Three rangers scarified the soil and reseeded with native seeds and plants, and one ranger reseeded by aircraft. In addition, four rangers have closed impacted areas to allow for natural recovery. Refurbishing of sites was also attempted by removal of fire rings and

nonconforming structures. Five rangers said they would like to do more to revegetate and/or refurbish their sites. More information is needed at all management and administrative levels to understand the effectiveness and impact of revegetation and natural recovery on wilderness in the Southwest. Careful monitoring should be encouraged for those district rangers who have attempted to use innovative strategies of site management. As site management technology is developed, evaluated, and improved, it should be transferred to those districts with the greatest interest and need.

Programs or facilities to ensure proper disposal of human waste in the wilderness were reported by 75 percent of the wilderness district rangers. Fifteen rangers informed visitors of proper human waste disposal through their visitor education program. Many rangers relied on the regional brochure to educate their visitors about appropriate disposal techniques. Two districts had a pit toilet as part of their human waste disposal program. Only three rangers reported dissatisfaction with their human waste disposal program. Their dissatisfaction should be interpreted by administrators as an area of informational need.

Grazing Management

Grazing and range allotments were monitored by 85 percent of the wilderness district rangers. The level of satisfaction with the monitoring was extremely high. Nine of the rangers had a grazing/range allotment policy specific to their wilderness and five more rangers wanted to adopt such a policy. There seemed to be inconsistency among district rangers regarding policy definitions and/or sources. Technology transfer efforts should focus on clarification of grazing and range "policy" versus strategies and practices.

Fire Management

The trend in fire management is moving toward prescribed natural fire and planned ignition in the Southwest. Area-specific fire management policies were reported by 45 percent of the wilderness district rangers. Eighteen additional rangers anticipated adopting such a policy. Most of the districts ($N = 14$) with a fire policy were using PNF and two districts were using planned ignitions. Satisfaction with the fire management policies was quite high, although nine rangers wanted less restrictions in their fire policy.

The requests for relaxed prescriptions should be perceived as an area of informational need. Districts with common concerns should be linked with districts that have implemented innovative fire management strategies. Administrators should continue educational efforts to inform

rangers of the most recent research findings regarding PNF and planned ignitions.

VISITOR MANAGEMENT

Almost all (93%) wilderness district rangers in the Southwest monitored visitor use, although half (48%) of these rangers reported dissatisfaction with their visitor use monitoring system. Satisfaction with visitor use monitoring was lower than with all other monitoring strategies. Many rangers felt their monitoring did not give accurate and/or adequate information. A variety of visitor use monitoring techniques were used, illustrating that no one system is appropriate for all situations. For example, the mandatory permit system has been or is being used in a number of districts, with a variety of satisfaction levels. Some districts are eager to replace mandatory permits with self registration whereas other rangers expressed enthusiasm for the permit system as "the most accurate use measurement for their wilderness." Forest Service administrators need to transfer innovative visitor use monitoring strategies to those districts that are not satisfied with their current monitoring system. An exchange among rangers with similar situations would be useful for sharing advantages of and potential problems with the available visitor use monitoring strategies.

Commercial recreation carrying capacity had been determined by only three wilderness district rangers, while seven rangers had determined the noncommercial carrying capacity of their wilderness. District rangers in the Southwest generally recognize the role of researchers in establishing carrying capacity; however, there is some variance regarding desired degree of involvement and/or responsibility of the researchers.

Cooperation between the researcher and the manager is essential for the determination of recreational carrying capacity, as it provides integration of research methodology and managerial knowledge of on-site variables. Regional and forest administrators and district managers need to collectively discuss the role of research in determining recreational carrying capacity. Communication should be facilitated between the management and research communities to encourage mutual understanding and agreement of their respective roles. The degree of research involvement must be determined for each wilderness, allowing for differences in topography, user trends, and management decisions.

Visitor use was being limited in six districts with use ceilings for different spatial or temporal zones. None of the districts assigned visitors to campsites, while one-fourth of the nonwilderness district rangers said they "would" assign visitors to campsites. This indicates a tendency among nonwilderness district rangers to be theoretically

more heavy-handed in their wilderness management approach. Innovations for visitor management that include the more common Forest Service approaches of indirect management should therefore be transferred to these potential wilderness managers.

Information or education programs were reported by 98 percent of the wilderness district rangers. A variety of educational techniques, both active and passive, both direct and indirect, have been used to communicate with the visitor. Fourteen wilderness district rangers reported a trailhead information program. Eighteen rangers reported in-town education for schools and 17 rangers provided in-town education for recreational groups. Twenty-two rangers educated the user in the wilderness, on either a formal or informal basis. Only five district rangers reported use of a WIS (Wilderness Information Specialist) program.

Many rangers expressed a desire for an expanded program and often suggested financial constraints as the limiting factor. Technology transfer efforts must address the many alternatives to increased funds. Networks need to be established between the districts with active and direct education strategies and districts that are desiring such a program. District rangers should be encouraged to utilize a combination of program strategies rather than depending on one technique to meet the educational needs. As discussed by Jim Bradley regarding the human approach to education, the most comprehensive education programs have provided information in the wilderness, in-town, and at the trailhead (Bradley, 1979).

An example of innovative educational programming is the Mesa Ranger District where the Wilderness Skills Trail was designed and developed entirely by volunteer labor. The volunteer WIS coordinator of in-town education contacted the local Arizona State University outdoor education program and recruited an undergraduate class to design a Wilderness Skills Trail as a class project. Such innovation encourages partnership between agencies, offers education to the students, and provides a low-cost educational tool. Administrators need to facilitate linkages between community resources, Forest Service personnel experienced in utilizing innovative approaches to visitor education, and rangers who are seeking ideas for program expansion.

A needs assessment should take place in districts that have low key education programs and do not see a need for expansion. It should be determined if there is a need for an educational program in the given district and/or a need for innovative ideas and technology transfer regarding education program potentials. Finally, there is a need for systematic evaluation of visitor education programs to determine their effectiveness. Administrators and research personnel need to collaborate with managers to develop cost effective and accurate evaluative techniques.

WILDERNESS MANAGEMENT PROBLEMS

The most common wilderness management problems, as identified by the wilderness district rangers, included inadequate funding and FTEs, overcrowding and overuse, and vehicular intrusions. By carefully examining the wilderness management problems, a number of technology transfer needs are apparent. Funding is a major concern, therefore innovations are needed regarding agency partnerships, volunteer programs, and new cost-effective management strategies. District rangers need to be educated and encouraged to perceive retrenching dollars as a positive challenge rather than a managerial defeat.

Regarding overcrowding and overuse, more research cooperation is necessary between managers and researchers to determine limits of acceptable change and carrying capacity. Rangers need to be informed regarding assessment strategies currently available. Administrators should encourage debate among managers regarding perceptions of overcrowding in relation to the wilderness opportunity spectrum. Research literature regarding concentration versus dispersion and the corresponding visitor impact on the wilderness resource should be transferred to the wilderness managers (see Cole and Stankey, 1980). Alternatives to overcrowding such as changing access points and dispersing use through education need to be implemented and tested for effectiveness.

Districts with common problems such as vehicular intrusion, conflicts over grazing, and problems of access or boundary markers should be linked to share common concerns and solutions. Development of new technology should be targeted to these more common problems. In addition, some of the less common problems, such as bears eating signs, are very serious to some rangers and technology needs to be developed and/or targeted to the individuals who have identified unique concerns.

WILDERNESS TECHNOLOGY TRANSFER

Wilderness schools and training workshops have been an extremely popular and useful tool for transferring information regarding wilderness management. District rangers were asked to identify the three sources of information about wilderness management they found most helpful. Over half ($N = 23$) of the 40 wilderness district rangers identified wilderness schools, workshops, and training conferences as helpful sources of information; 22 wilderness district rangers listed research literature; 20 referred to literature distributed interoffice or inter-Forest Service; and 17 identified communication with other wilderness rangers. Only four district rangers (including both wilderness and nonwilderness) mentioned the wilderness management textbook (Hendee and others, 1978) as a helpful source of information.

Given the enthusiasm for wilderness schools and/or training workshops, administrators should consider these sessions a prime target for technology transfer planning. Sharing of information, both vertically between administrators and management and horizontally among management personnel, is facilitated at the wilderness schools and workshops. The training workshops offer an ideal setting for communication and one-to-one dialogue among the on-ground rangers, which was identified as a major source of wilderness management information. These sessions also impact the frequency of continued contact among wilderness managers, researchers, and administrators.

Only 15 of the 40 wilderness district rangers had attended a wilderness school or training workshop in the past year and six wilderness district rangers had attended a professional conference which included wilderness issues. Regional administrators should note that 14 wilderness district rangers and five new (1984) wilderness district rangers had experienced a decrease in frequency of attendance at these conferences in the past year.

Although research literature was identified as a helpful source of wilderness management information, only 18 wilderness district rangers could identify by name or location an experiment station that conducts wilderness-related research. When the district rangers were asked to identify wilderness researchers, 21 district rangers identified at least one individual. However, several of these rangers referred to the interviewer or Forest Service employees who are not actively involved in wilderness research. Almost all district rangers have been receiving the list of experiment station publications and all but seven said they received other publications from the experiment stations. Thirty-five of the 64 district rangers had the wilderness management text.

Based on the findings, it seems there is some breakdown in communication between the Forest Service research branch and the on-ground managers. Many district rangers are apparently unfamiliar with the wilderness research stations and the wilderness researchers. Several district rangers are not familiar with the availability of numerous wilderness-related research publications. These findings do not offer a complete insight into rangers' knowledge of technology based on current research. Again, 22 of the 40 wilderness district rangers said research literature was one of their most helpful sources of information about wilderness management. It is possible that the rangers have read the materials and simply have not familiarized themselves with the names of the authors or experiment stations. On the other hand, given the low level of rangers' familiarity regarding the sources of the research, the results indicate that research literature may not be nearly as helpful as it could be with improved technology transfer.

Administrative efforts must be directed in part to the basic transfer of written information, as the research documents are a valuable

means of cost-effective education and communication. Research literature should be targeted directly to districts with management problems and informational needs as specified in this study. Finally, researchers and/or research findings should be utilized in workshops and conferences, providing a forum to link research with on-ground management and encouraging dialogue between the research and management components of wilderness management.

CHAPTER IV

RECOMMENDATIONS

The following recommendations are based on the primary observations and interpretations of the investigator. The recommendations include ideas, concepts, procedures, and innovations that might be considered by wilderness managers. The intent is to help Forest Service administrators decide what kinds of information to provide field managers in a planned technology transfer effort.

The format for this section is a presentation of six wilderness management priorities based on the findings of this study. These priorities reflect categories that emerged as the areas of greatest need for wilderness management in the Southwest.

Priority 1: Adopt a conceptual framework for long-term wilderness management planning in the Southwest.

Central to the findings of this study is that a common approach to wilderness management in the Southwest has been crisis management. Managers have tended to deal with issues as they occur rather than develop long-term planning systems for the wilderness areas. Such a response to management issues has been understandable, given the relatively recent evolution of wilderness management. However, with the emerging complexity of wilderness management, there is now a need to implement planned-change strategies rather than rely upon reactive strategies.

In addition, wilderness management techniques in the Southwest appear to be inconsistent among areas. Managers often deal with perceived problems in isolation, often with unanticipated and/or unrecognized side effects. This inconsistency in wilderness visitor management is confusing to the public and makes the visitor education task difficult (Lucas 1985). Some variation in management techniques are justified because of differences in conditions among areas. However, it

seems that some of the inconsistency reflects a lack of knowledge of both environmental impact processes and the behavioral and social psychological characteristics of recreational visitors (Lucas 1985). A conceptual framework is needed which integrates the social and ecological aspects of visitor management. A planning system is needed which offers regional coordination for wilderness management and a consistent monitoring and management framework.

The most comprehensive system for wilderness planning is the Limits of Acceptable Change (LAC) system, as developed by Stankey and others, 1985. The underlying premise of the LAC concept is that change is a natural, inevitable consequence of recreation use (Stankey and others, 1984). Both environmental and social changes are considered. Within the LAC framework, the traditional question about carrying capacity is redefined from "how much use is too much?" to "how much change is acceptable?" (Stankey and others, 1984). The LAC process focuses on managing for desired environmental and social conditions rather than on how recreation use per se should be managed. The LAC context for capacity issues is prescriptive rather than technical. The problem of acceptability is ultimately one of personal judgement, not science. Judgements of acceptability require the combined viewpoints of managers, researchers, and citizens (Stankey and others, 1984).

The LAC planning system should be adopted in the Southwest as a conceptual framework to guide communication and to integrate the social and ecological aspects of visitor management. The LAC provides a standardized and systematic thinking process that may guide managers in their long-term planning efforts, but should not be perceived as a tool for land allocation. It is meant to be a "conceptual process--not policy" (Stankey and others, 1985, p. 3). A major contribution of LAC is that it standardizes the management process while allowing for managerial and environmental differences. The LAC offers a common process approach that is needed to alleviate isolated responses to management problems.

LAC originated from the management-by-objectives (MBO) approach to planning and is purposed to be dynamic and continuing. There are four major components in the LAC process:

- (1) the specification of acceptable and achievable resource and social conditions, defined by a series of measurable parameters;
- (2) an analysis of the relationship between existing conditions and those judged acceptable;
- (3) identification of management actions necessary to achieve these conditions; and

- (4) a program of monitoring and evaluation of management effectiveness. (Stankey and others, 1978, p. 3)

In summary of the previous discussion, the LAC process requires managers to define desired wilderness conditions and to identify and implement actions to maintain or achieve these conditions.

The emphasis of LAC is on the management of recreational impacts. Nonrecreational uses are protected by law and are covered by administrative guidelines; therefore, a land manager's responses to such uses are limited. The LAC focus on recreation impacts is relevant to the findings of this study. For example, rangers were generally satisfied with their grazing management due to the availability of specific guidelines. On the other hand, they expressed much concern regarding visitor management and recreational impacts, especially with reference to overcrowding and overuse.

The LAC process of inventorying existing resource and social conditions is also relevant to the expressed needs of many district rangers in the Southwest. Such an inventory allows for comparison of *what is* and *what ought to be*, based on predetermined definitions of desired wilderness qualities.

Another area of concern among the Southwestern wilderness rangers was monitoring of environmental change and visitor use. Levels of satisfaction with current monitoring strategies were generally average to slightly above average. However, administrators should evaluate the high satisfaction with grazing monitoring and the low satisfaction with visitor use monitoring. A guiding principle for interpretation of the findings is that low levels of managerial satisfaction indicates an area of informational need. Many rangers noted their satisfaction with grazing monitoring was a result of "few grey areas"; and the monitoring strategies "are well defined." Such specificity in monitoring techniques should be a goal for all types of wilderness monitoring. Again, LAC planning provides a framework for systematic, achievable monitoring programs.

Very few district rangers had determined either the recreational or commercial carrying capacity of their area. Most rangers expected to determine carrying capacity in the future due to the mandates of the National Forest Management Act (NFMA). However, the general sentiment was one of frustration in not knowing how or where to begin the task. The LAC system allows rangers to determine the need for and/or estimate maximum levels of use. The LAC process does not encourage establishment of specific numerical capacities unless conditions exceed the established standards. If conditions are within standards, it is difficult to project how much additional use can be accommodated before the increasing impact reaches the standards. In such a case, numerical

capacities are meaningless and the appropriate conclusion is that capacity is greater than current use (Washburne 1982).

If existing conditions are close to or beyond the standards, management action is required. Some action other than a limit on use numbers is recommended, such as increased emphasis on minimum impact camping. If other actions do not suffice, or if the standards are exceeded by a wide margin, then use levels should be imposed (Stankey and others 1985).

If existing conditions are close to those described in the predetermined standards, then managers can assume that current use levels approximate capacity: the numerical capacity would be set at a level close to the current use level. Monitoring will determine if this decision was appropriate. If conditions become worse, then the use level should be reduced (Stankey and others, 1985, pp. 20-21).

In summary, LAC offers a systematic planning framework that addresses many management concerns expressed in this study. Administrators and managers should perceive the LAC as a conceptual framework to guide wilderness management. It is not a land allocation system. The LAC process allows for coordinated approaches to wilderness management and offers a consistent monitoring/management framework. Therefore, wilderness managers should be encouraged to apply the LAC process to their wilderness and, through their experience, modify it and improve upon it. The public should be involved throughout the process. Administrators should transfer LAC information to the managers. The LAC conceptual framework should be integral to wilderness-related training sessions.

Priority 2: Facilitate networking among wilderness managers.

Results of this study indicate that managers have dealt with perceived problems in isolation. Much of the variation in management responses has resulted from the absence of a conceptual framework for planning. However, a coordinated system for networking has also been lacking. Such a system would encourage more consistent management responses to similar perceived problems. The district rangers reported that one of the most important sources of wilderness management information was communication with other wilderness managers. The success of such transfer of information indicates a need to enhance the potential opportunities for comprehensive networking among the district rangers.

This study should serve as a foundation for networking among district rangers in the Southwest. Results of this study provide an indirect means of communication regarding current wilderness management practices, problems, and philosophies among the 64 district rangers. This document should be evaluated by the rangers regarding its usefulness for networking, and should be updated on a regular basis.

There is also a need for more direct communication among the wilderness managers in order to develop working relationships and cohesion. Wilderness schools, workshops, and training conferences provide a forum for such networking. In addition, task forces composed of wilderness managers should be created to address common management problems. Hopefully, as managers meet to discuss wilderness issues, the problem of isolated solutions will be reduced.

The variation of wilderness management philosophies should be discussed; allowing for all managers to strive for a better understanding of their responsibilities in relation to the Wilderness Act. Disagreements should be professionally grappled with rather than ignored. For example, one ranger felt that a major problem with present wilderness management is the attitude of production-oriented managers toward wilderness. Such philosophical issues should be addressed within a workshop or training conference.

Networking is especially important for the managers who recently acquired wilderness responsibility, due to recent legislation or job transfer. Opportunities for direct communication and transfer of information should be facilitated between the more experienced wilderness managers and those with minimal or no experience.

If administrators encourage utilization of the LAC process, networking among managers could be a valuable tool for sharing common problems and solutions. Coordination of planning efforts might also reduce some of the potential intimidation of a new planning system.

Priority 3: Wilderness schools, workshops, and training conferences should continue to be a primary means of technology transfer.

Results of this study indicate strong success of and support for the wilderness school as a forum for education and communication regarding wilderness management innovations. Therefore, Region 3 should maintain the annual wilderness school and encourage rotating participation of present and future wilderness managers. The schools should be especially targeted to district rangers, recreation and land staff, and recreation personnel from the supervisor's office. The various wilderness-related workshops and training conferences have also been popular as they facilitate networking among the managers. These opportunities should be expanded and provided to all wilderness managers on a regular basis.

Based on the findings of this study, the wilderness management training sessions should focus on the social and ecological aspects of visitor management. Case studies of various management strategies should be presented. The results of this study indicate that priority topics of discussion should include a conceptual framework for wilderness management planning, visitor use monitoring methods, monitoring

environmental change, volunteer management, perceptions of crowding, concentration versus dispersion of visitors, site management and restoration, and the value of and techniques for visitor education. A general area of concern that should also be addressed at training sessions is the inconsistent definitions of management concepts and terms; for example, multiple use management and carrying capacity.

Priority 4: Wilderness managers should expand and coordinate visitor education programs as their primary tool for indirect visitor management.

Based on the findings of this study, a small percentage of the districts in Region 3 have a comprehensive visitor education program. Concurrently, the literature provides strong support for indirect, light-handed management (Hendee and others, 1978; Stankey and others, 1985). Indirect management approaches allow maximum choice and freedom for the wilderness visitor. The most common means of indirect management is visitor information/education programs.

The potential value of visitor education as a management tool should be emphasized among wilderness managers in the Southwest. Research has demonstrated a strong and positive correlation between backcountry visitor knowledge and visitor behavior (Robertson, 1982). That is, wilderness visitors who are aware of recommended low-impact behavior tend to act in congruence with the recommendations. Based on observations of the investigator, until the manager is convinced of a need for education and its possible effectiveness, the program potential is limited. Therefore, efforts should be made to transfer information regarding the potential value of education programs for reducing impacts of the wilderness visitor.

There is an immediate need for coordinating visitor education on a regional basis. The goal is not to achieve carbon copy programs; each district has unique needs. The goal is to develop consistency and coordination in terms of content and technique. Standards for content and technique need to be developed based on the given user trends, predictions, and the resource conditions. A task force should be extracted from wilderness managers who have extensive education programs as well as managers who have limited their programs to district office contacts. The task force should initiate a visitor education needs assessment of the 64 districts in Region 3. Results of this administrative study could provide the foundation for determining the status of education programs throughout the region. The task force should make recommendations to the regional office for a coordinated education program. The program should be integrated into the LAC conceptual framework. The LAC system provides a structure for determining the level and kind of education appropriate, based on predetermined management objectives.

The task force should be informed regarding a variety of wilderness education techniques. Researchers have found that the most effective means of communicating information on low-impact use is through personal contact (Fazio, 1979; Oliver and others, 1985). Personal communication at the trailhead and inside the wilderness has the advantage of focusing on people actually using the wilderness. The wilderness ranger or volunteer can modify their educational messages to the specific individual or group circumstances. Trailhead contact is recommended over contact inside the wilderness as it is less intrusive to the visitor's wilderness experience. In addition, given the funding limitations for wilderness rangers and volunteers, trailhead education programs are more efficient in reaching a high percentage of users with a limited number of personnel. Trailheads should be prioritized for visitor education in conjunction with LAC planning objectives.

The WIS (Wilderness Information Specialist) programs have been highly effective and should serve as model educational programs within Region 3. The WIS programs usually involve a combination of personal communication at the trailhead, inside the wilderness, and in the community. Districts that currently rely on the brochure and map for visitor education should begin to implement programs that involve personal communication; the extent of the programs should be determined through LAC planning. It is difficult to determine the effectiveness of in-town wilderness education programs. In districts where in-town education is feasible, education should be targeted to identified user groups, such as scouts and various outdoor recreation clubs.

The regional task force should address visitor education strategies for multiforest wilderness areas followed by subsequent National Forest level coordination of multidistrict wilderness areas. In addition, the managers who recently acquired wilderness responsibility should be targeted for immediate transfer of information regarding the alternatives for visitor education. Finally, interpretation and environmental education should be coordinated throughout all administrative levels of the USDA Forest Service to recognize common goals and objectives for a coordinated wilderness education program.

Priority 5: Managers, administrators, and researchers should cooperate to design and implement evaluation techniques for measuring the effectiveness of wilderness management.

Based on the findings of this study, managers have limited and sporadic data on visitor use and impact. Administrators, researchers, and managers should be reminded of the 1985 National Wilderness Research Conference (Lucas, 1985) plea for baseline descriptive visitor data, especially in the Southwest. Broader issues cannot be addressed until researchers and managers have an accurate perspective of the scope of their task.

The methods of dispersion versus concentration of wilderness visitors need to be tested with systematic evaluative strategies. Field managers should be informed of the nondegradation concept, which addresses variation in the level of naturalness and solitude available in individual wilderness areas. The objective is to prevent further degradation of current naturalness and solitude in each wilderness and simultaneously restore substandard settings to minimum levels. The purpose is to prevent all wilderness areas from deteriorating to a minimum standard (Roggenbuck and Watson 1982).

Visitor education programs need to be evaluated on a regional scale. Personal contacts at the trailhead, inside the wilderness, and in the community need to be analyzed for their effectiveness in reducing impacts of the wilderness visitor. The personal-contact approach to visitor education should be systematically compared to the more traditional approaches, such as the brochure, maps, and trailhead signs.

Site management requires restoration of substandard settings. Results of this study indicated that managers are uncertain as to the most effective means of site restoration in the Southwest. More information is needed on the advantages and disadvantages of site closure (allowing for natural recovery) and revegetation (scarifying the soil and reseeding with natural vegetation). A variety of site management approaches should be implemented and systematically evaluated.

Based on this study, many wilderness managers are unable to determine the effectiveness of their management practices. There is a need for case studies of both traditional and innovative approaches to wilderness management. Administrators should link managers and researchers who, in turn, should cooperatively design and implement evaluation strategies for a variety of management techniques.

Priority 6: Volunteerism, agency partnerships and community involvement should be emphasized and expanded in Region 3.

Inadequate funding was a serious problem reported by many district rangers in the Southwest. Innovative management strategies are needed to combat the concern for funding. Administrators should encourage managers to view this area of need as a challenge for creative strategies rather than a managerial burden. The present study is an example of agency partnerships, whereby the Forest Service contacted the university to cooperatively study wilderness management in the Southwest. Case studies of various wilderness management practices could also be initiated through agency partnerships.

Volunteer management should be emphasized as a priority in Region 3. Educational training sessions should be offered to include recruitment, selection, training, and retention of volunteers. A task force should be created to coordinate the volunteer program on a regional basis. Managers should be transferring information regarding the

potential of volunteer management. Again, until managers see the need for volunteers, the appropriate innovations will not be useful.

Community involvement should be sought through the volunteer and public relations program. Organized recreation groups are often eager for community projects. Public input should be sought regarding wilderness management strategies, which is integral to the LAC process. Such involvement by the public may stimulate interest and a desire to assist in volunteer projects. The Student Conservation Association and secondary education classes provide a pool of resources that needs to be utilized.

Ranger districts that have actively utilized volunteers and have sought community involvement should be systematically evaluated as case studies to determine the cost and effectiveness of their programs. Districts that have been successful in their innovative efforts to counteract stable or declining recreation budgets should be presented as case studies within managerial training sessions.

CONCLUSION

This study has focused on the wilderness management practices, philosophies, perceptions of problems, and areas of informational need of the district rangers in the Southwestern Region of the USDA Forest Service. The intent of the investigation was to provide a common understanding of the present status of wilderness management in the Southwest.

Hopefully, this baseline study will be useful to managers, planners, and the research community in developing informed and innovative wilderness management strategies.

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APPENDIX A

INTRODUCTORY OUTLINE

[NOTE: This document was sent to all district rangers in preparation for the Wilderness Manager Interview.]

I Wilderness Management Plan

- A. Do you have an approved wilderness management plan?
 - 1. Are you satisfied with it?
 - 2. How could it be more useful?
 - 3. Was public input involved in preparing the plan?

II Monitoring Wilderness Use

- A. Do you monitor the amount of visitor use of your wilderness?
 - 1. How do you measure use?
 - 2. Are you satisfied with your measurement tools?

III Monitoring Environmental Change

- A. Answer the following questions for each of these components:
 - 1. Are you monitoring for this?
 - 2. How do you monitor?
 - 3. Are you satisfied with the monitoring system?
 - 4. What alternative systems have you considered?
 - a. Wildlife and fisheries
 - b. Vegetation
 - c. Water quality
 - d. Air quality
 - e. Campsite conditions
 - f. Trail conditions
 - g. Soil conditions
 - h. Range (grazing) allotments
 - i. Mineral claims
 - j. Cultural resource sites

IV Wilderness Carrying Capacity

- A. Have you determined the carrying capacity of your area for recreational use?
 - 1. How did you determine the carrying capacity?
 - 2. Do you feel the method you used was adequate?
 - 3. What do you see as the respective roles of researchers and managers in determining wilderness carrying capacity?

V Visitor Management Program

A. Do you now limit visitor use of your wilderness?

If yes:

1. Do you have different use ceilings for different zones within your area?
2. How did you decide on your current use ceilings?
3. Are you satisfied with your current use ceilings?
4. Within your use ceiling, how do you decide who gets to use the wilderness?

If no:

1. Do you anticipate setting an overall use ceiling for your area in the near future?
2. How would you decide upon an appropriate use ceiling?
3. How might you decide who gets to use the wilderness?

B. Do you assign visitors to campsites in your area?

C. Have you tried to limit or alter use of your wilderness by changing access routes to the area?

D. Have you used information or education programs to encourage your visitors to reduce their impacts upon the wilderness?

If yes:

1. Describe your visitor education program.
2. Are you satisfied with your visitor education program?
3. What other visitor education programs have you considered?

If no:

1. Do you anticipate implementing any education programs to help reduce visitor impacts in your area?
2. What kind of a visitor education program do you think would be helpful in your area?

VI Site Management

A. Do you have programs to disperse use? (explain)

B. Do you have a program to concentrate use at certain locations in the wilderness? (explain)

C. Have you attempted to revegetate or refurbish any of your wilderness use impact sites? (explain)

D. Do you have a program or facilities to ensure proper disposal of human wastes (excrement) in your wilderness? (explain)

VII Wildlife and Fisheries Management

- A. Describe your objectives for wildlife management in your wilderness.
- B. Do you manage wildlife in wilderness any differently than in the nonwilderness portions of your district?

VIII Fire Management

- A. Do you have a fire management policy specific to your wilderness? (describe)

IX Grazing and Range Allotment Management

- A. Do you have a grazing and range allotment management policy specific to your wilderness?
- B. Do you manage for grazing in wilderness any differently than in the nonwilderness portions of your district? (explain)



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✓



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